USDA United States Department of Agriculture

Forest Service

Intermountain Research Station

Resource Bulletin
INT-RB-91

July 1997

Forest Resource Statistics for Northern Utah, 1993

Mark J. Brown
Renee A. O'Brien

The Authors

Mark J. Brown is a Resource Analyst with the Forest Inventory and Analysis Project of the Southern Research Station in Asheville, NC. He holds a B.S. degree in forest resources management from the University of Georgia and a Master of Forestry degree from Clemson University. Formerly a supervisor of forest survey field crews, he has been on detail to the Interior West Resource Inventory, Monitoring, and Evaluation Program at the Intermountain Research Station in Ogden, UT.

Renee A. O'Brien is Lead Ecologist and Analysis Team Leader with the Interior West Resource Inventory, Monitoring, and Evaluation Program at the Intermountain Research Station in Ogden, UT. She holds a B.S. degree in botany from Weber State University and B.S. and M.S. degrees in range science from Utah State University.

Research Summary

About 5.2 million acres, or 25 percent, of northern Utah is forested. Fifty-two percent of this forest area is capable of producing commercial wood products and is classified as timberland. Forty-eight percent is classified as woodland, primarily pinyon-juniper. The predominant forest types on the timberland are aspen, Douglas-fir, lodgepole pine, and spruce-fir. The National Forest System manages 70 percent of the timberland; 23 percent is under private ownership, and 7 percent is under other public ownership (local, State, and other Federal). Thirteen percent of the timberland is withdrawn from commercial timber production and is in a reserved status. Most reserved timberland is found under National Forest System management. The total volume of growing stock on nonreserved timberland in northern Utah is 3.4 billion cubic feet. In order, Douglas-fir, lodgepole pine, aspen, Engelmann spruce, and subalpine fir species account for most of the volume. Net annual growth averages 38.6 million cubic feet after the impact of mortality, which averaged 47.9 million cubic feet annually.

Preface

Statewide forest inventories are part of an ongoing, nationwide effort of the Forest Service, U.S. Department of Agriculture, to assess the Nation's forest lands. Forest Inventory and Analysis, a subgroup within Forest Service Research, is responsible for this task. Forest Inventory and Analysis uses periodic, State-by-State, sample-based inventories, and was initially authorized by the McSweeney-McNary Act of 1928. The current authorization is through the Renewable Resources Research Act of 1978.

In the Western States of Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming, Forest Inventory and Analysis inventories are conducted by the Interior West Resource Inventory, Monitoring, and Evaluation Program at the Intermountain Research Station in Ogden, UT. These inventories provide data on land area and wood volume that can be classified for many resource uses and provide an extensive data base for forest lands. The inventory of northern Utah is the first comprehensive inventory across all ownerships conducted by our field crews.

Acknowledgments

The Intermountain Research Station gratefully acknowledges the cooperation of the Utah State Forester and other Utah Department of Lands personnel; the Bureaus of Land Management and Indian Affairs, National Park Service, U.S. Department of the Interior; and the Intermountain Region, Forest Service, U.S. Department of Agriculture. Appreciation is also expressed for the cooperation of other public agencies and private landowners in providing information and access to the sample locations.

Intermountain Research Station
324 25th Street
Ogden, UT 84401

Contents

Forest Resource Statistics for Northern Utah, 1993

Mark J. Brown
Renee A. O'Brien

Introduction

In 1993 the Interior West Resource Inventory, Monitoring, and Evaluation Program of the Intermountain Research Station completed a comprehensive forest survey of lands in northern Utah. The 14 counties of Box Elder, Cache, Davis, Daggett, Duchesne, Morgan, Rich, Salt Lake, Summit, Tooele, Uintah, Utah, Wasatch, and Weber make up the area of northern Utah described in this report. Principal findings of the forest survey are presented in this report, followed by 63 summary tables of forest statistics for land in northern Utah. The tables show forest land area, tree numbers, wood volume and growth, and tree mortality, and are organized by ownership, stand, and tree classification variables. Tables 1 through 4 present information about all land in northern Utah and standard error percents. Tables 5 through 40 are devoted to timberland, and tables 41 through 55 are devoted to woodland. Tables 56 through 63 provide information by individual counties. This is the first statistical report for northern Utah that is a comprehensive sampling by field crews of all ownerships including National Forest System. A complementary report by O'Brien (1996) provides a more ecological approach to describing the forest resources of northern Utah based upon ecoregions.

Land classification categories are individually defined in a glossary of standard forest survey terminology within this report. However, an overview of the classification relationships may provide a better understanding of how these groups are subdivided. Land area is divided into forest and nonforest (fig. 1). Nonforest includes range, agriculture, urban lands, and water; and may have a small amount of tree cover. Forest land is subdivided into timberland and woodland. Timberland includes forests of tree species traditionally used in the forest products industry. Douglas-fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*), Engelmann spruce (*Picea engelmannii*), and aspen (*Populus tremuloides*) are common timber species. Woodland includes shrubby tree species that typically have a multistem growth form and are not traditionally used for industrial wood products. Rocky mountain juniper (*Juniperus scopulorum*), curlleaf mountain mahogany (*Cercocarpus ledifolius*), Gambel oak (*Quercus gambelii*), and common pinyon (*Pinus edulis*) are typical woodland species.

Across all these classifications, the land may be reserved or nonreserved. In the case of forest land, nonreserved forest land is available for tree utilization; reserved forest land is not. Forest land found in wilderness areas (as designated by Congress) and National Parks typify reserved forest land. This report focuses on the nonreserved component of the timberland and woodland base.

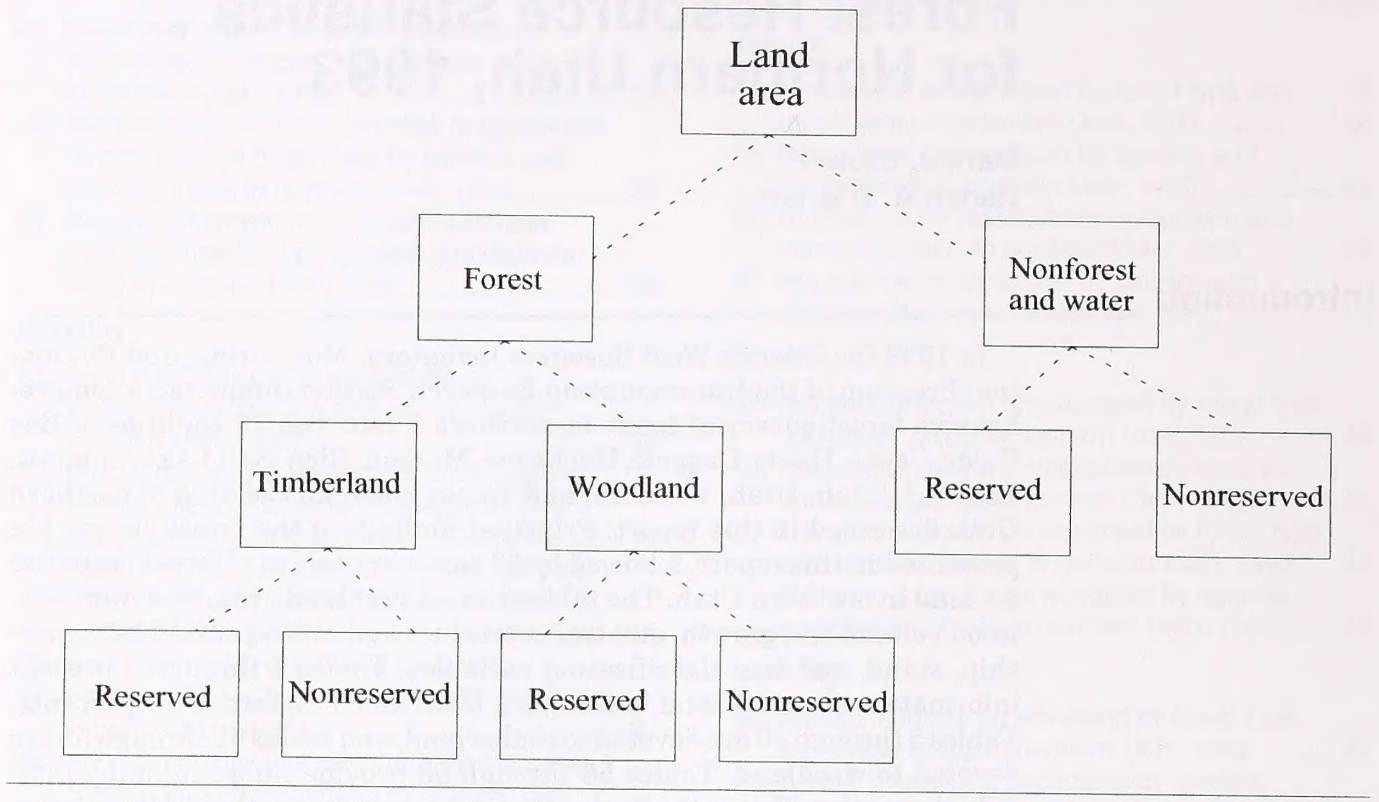


Figure 1—Forest Inventory and Analysis land classification.

All Land

All land includes water, timberland, woodland, and nonforest, regardless of reserved status. The total area within the 14 counties of northern Utah is 20.9 million acres (table 1). Water accounts for 8 percent of this area. Private landowners control 37 percent of the total area; the National Forest System manages 16 percent, and other public agencies administer 39 percent (fig. 2). The Bureau of Land Management administers nearly two-thirds of the area in the other public category, and nearly one-fourth of the total area.

Forest cover occurs on 5.2 million acres, or one-fourth of northern Utah. Almost half of the forest cover is classified as woodland, and just over half is classified as timberland. Most of the forest land is distributed along the North/South Overthrust Mountains (that is, the Wasatch Range) and the East/West Uinta Mountains (fig. 3). Over two-thirds of northern Utah is nonforested land, largely in the desert around the Great Salt Lake, and the Uintah Basin. The remainder of the area is water, predominantly the Great Salt Lake.

Almost 12 percent, or 2.5 million acres, of the area in northern Utah is designated as reserved. While most of these lands are nonforested, they include nearly 356,000 acres of timberland, as well as 44,000 acres of woodland (table 1). Most of the reserved timberland occurs on lands under the National Forest System management. The largest portion of reserved timberland is located in the High Uintas Wilderness Area.

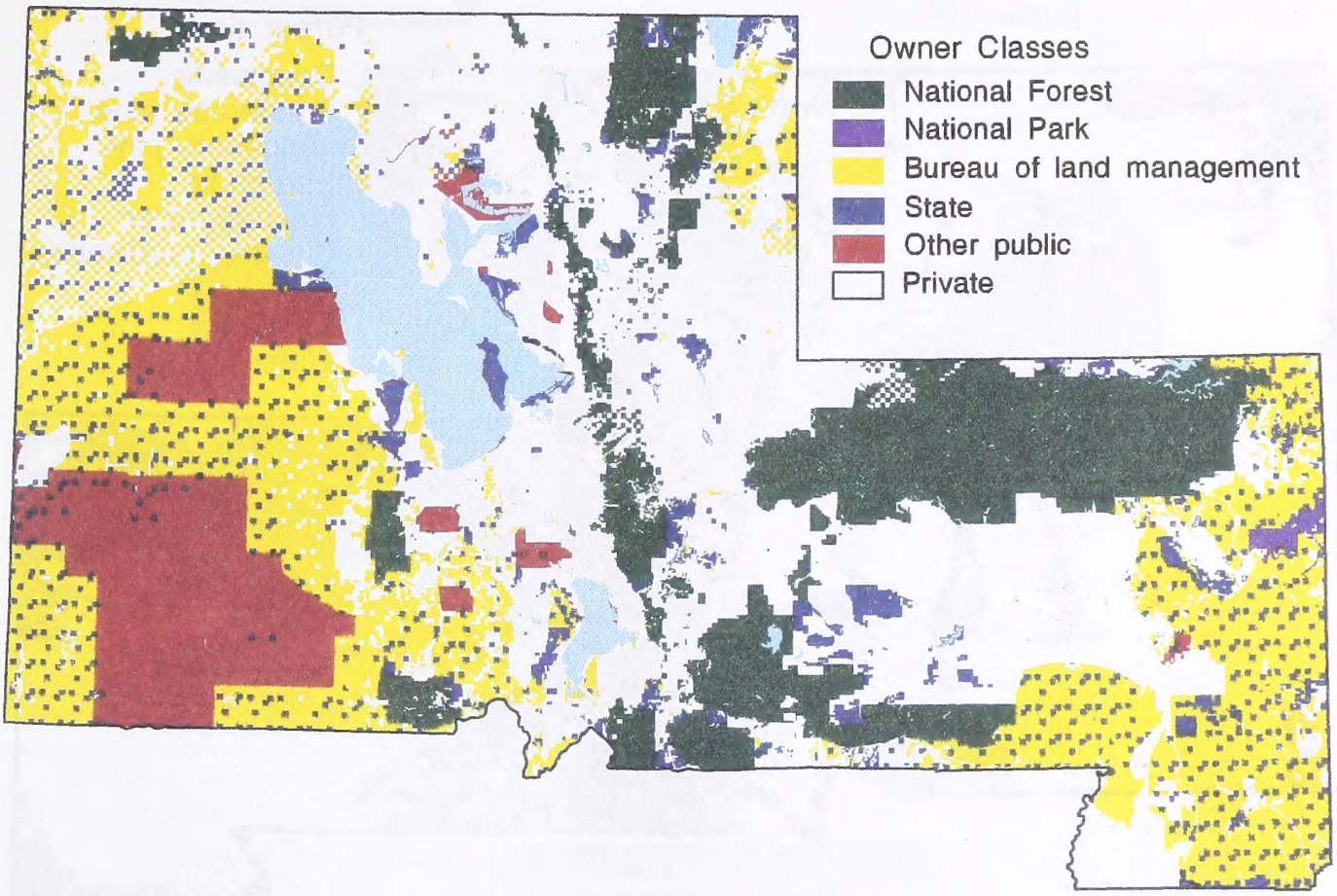


Figure 2—Area of northern Utah by major ownership categories. Private includes Indian lands.

Forest Land

Forest land includes timberland and woodland. Excluding the reserved areas, forest land in northern Utah totals more than 4.8 million acres (table 4). The remainder of this report and tables focus on these nonreserved forest lands.

At just under 2.5 million acres, woodland makes up more than half of the nonreserved forest land total. Proportionately, woodland accounts for more of the nonreserved forest land total than it did for all forest land, because more timberland is reserved than is woodland. Timberland comprises nearly 2.4 million acres of the nonreserved forest land in northern Utah.

Ownership

The ownership of northern Utah timberland differs significantly from that of woodland (fig. 4), though both types of forest land are primarily under public management. Two-thirds of the timberland is under National Forest

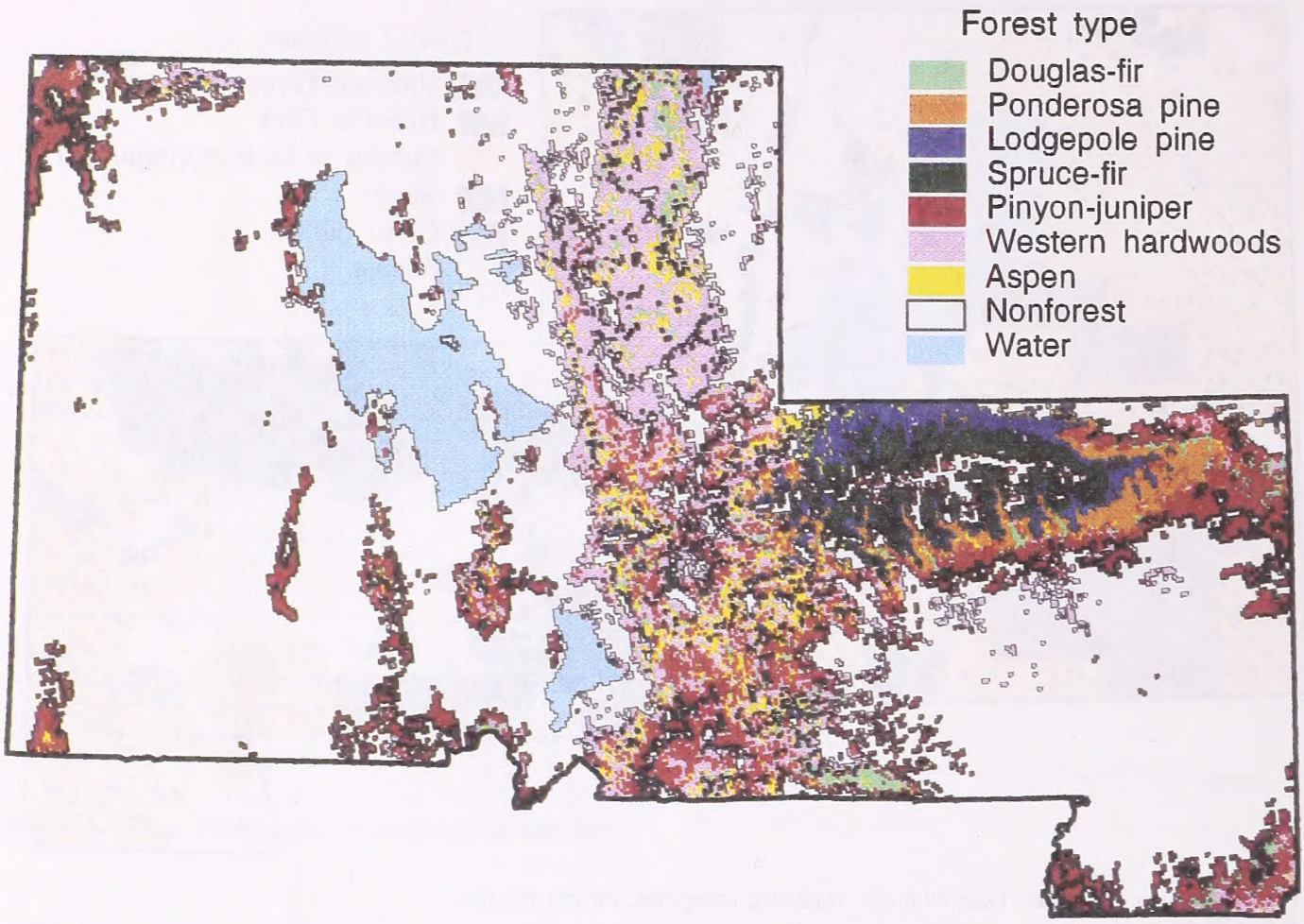


Figure 3—Classifications of forest and nonforest areas of northern Utah (Powell and others 1993).

System management, compared to just 16 percent of the woodland. Conversely, other public agencies administer just 8 percent of the timberland, but 44 percent of the woodland. Private ownerships control just 26 percent of the timberland and 40 percent of the woodland.

Forest Type

Aspen is the most common forest type on timberland (fig. 5) accounting for nearly one-third of the acreage. The Douglas-fir type is second, occurring on one-fourth of the timberland. Next are lodgepole pine and spruce-fir types, occupying 16 and 14 percent of the timberland, respectively. The remainder consists of spruce (primarily Engelmann), white fir, and ponderosa pine, followed by a trace of limber pine and cottonwood.

Woodland consists of fewer forest types. The pinyon-juniper type dominates the landscape, comprising almost half of the woodland. Pure juniper types account for more than one-fourth of the woodland. The oak forest type is found on nearly one-fifth of the woodland; maple and mountain mahogany make up the remainder.

Figure 4—Ownership of nonreserved forest land in northern Utah. NFS stands for National Forest System. Other public includes Bureau of Land Management, State, and miscellaneous Federal lands.

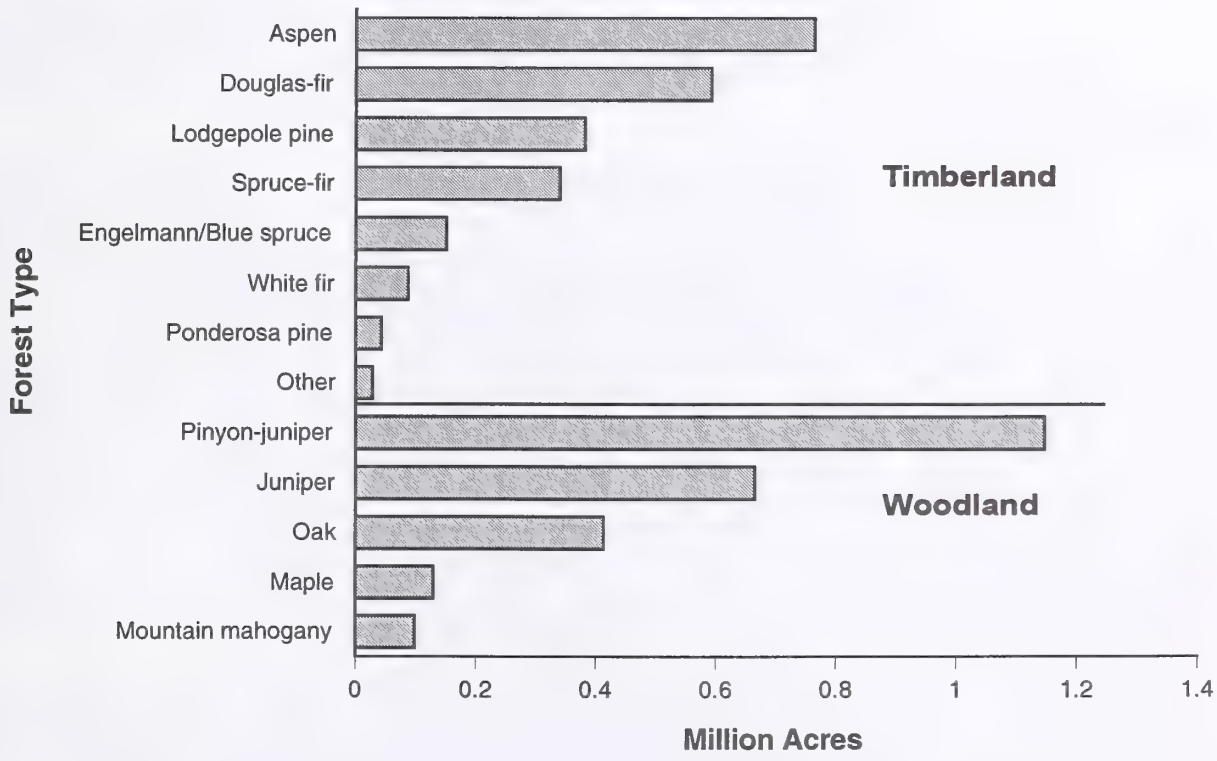


Figure 5—Area of nonreserved forest land by forest type in northern Utah. Other timberland includes limber pine and cottonwood types.

Stand-Size Class

Half of the stands on timberland are classified as sawtimber-size (table 5). Sawtimber stands are at least 10 percent stocked with growing-stock trees. Half or more of total stocking is in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking. Sawtimber trees are at least 9 inches in diameter at breast height (d.b.h.) for softwoods and 11 inches d.b.h. for hardwoods. Poletimber-size stands occur on 29 percent of the timberland. These are stands where poletimber stocking exceeds that of sawtimber. Poletimber trees are at least 5 inches d.b.h., but smaller than sawtimber. Sapling-seedling size stands make up 18 percent of the timberland. In these stands, more than half of the stocking is saplings or seedlings. Saplings range from 1 to 4.9 inches d.b.h., and seedlings are less than an inch d.b.h. Nonstocked stands are found on 3 percent of the timberland. Nonstocked areas are forest land with less than 10 percent stocking.

The stand-size distribution in woodland (table 42) is not comparable to that of timberland because of differences in tree measurements. Diameters of timber tree species are recorded at d.b.h.; woodland tree species diameters are measured at the root collar (d.r.c.). This is because many woodland tree species typically have multiple stems, or a more shrublike form. Unlike the traditional definitions for sawtimber, poletimber, and sapling-seedling for timberland stands, woodland stands are classed as large diameter if trees greater than or equal to 9 inches d.r.c. predominate, small-diameter if 3 to 8 inches d.r.c., and sapling-seedling size if less than 3 inches d.r.c. Under these classifications, half of the woodland stands are classified as small diameter, 40 percent as large diameter, 9 percent as sapling-seedling size, and 1 percent nonstocked.

Number of Trees

Figure 6 illustrates the distribution of trees by diameter class on nonreserved forest land. Timberland numbers include only growing-stock timber species (measured at d.b.h.); woodland numbers include both woodland species (measured at d.r.c.), and timber species that occasionally occur on woodland. The 2 inch class contains the highest number of trees on both timberland and woodland. However, this class contains a much higher proportion (62 versus 39 percent) of all trees on woodland than it does on timberland. The number of trees inventoried gives an overall indication of stocking levels—timberland averages 426 trees per acre compared with 522 trees per acre on woodland. Adding in the cull trees to the growing-stock trees on timberland gives all live trees, which is a better comparison to woodland tree numbers. However, the resulting 464 trees per acre on timberland is still below that of woodland. The higher average number of trees per acre on woodland reflects the dense shrubby stands typical of Gambel oak and some pinyon-juniper stands.

Stocking represents the portion of growing space utilized by growing-stock trees. Because the degree of stocking is important to wood fiber production, it can be used to describe timberland in more detail (table 10). One-half of the timberland is categorized as at least medium to fully stocked. Almost one-fourth is considered poorly stocked or nonstocked; these timberlands are below their potential for wood fiber production. The remaining one-fourth of the timberland consists of mature stands (average age greater than 100 years).

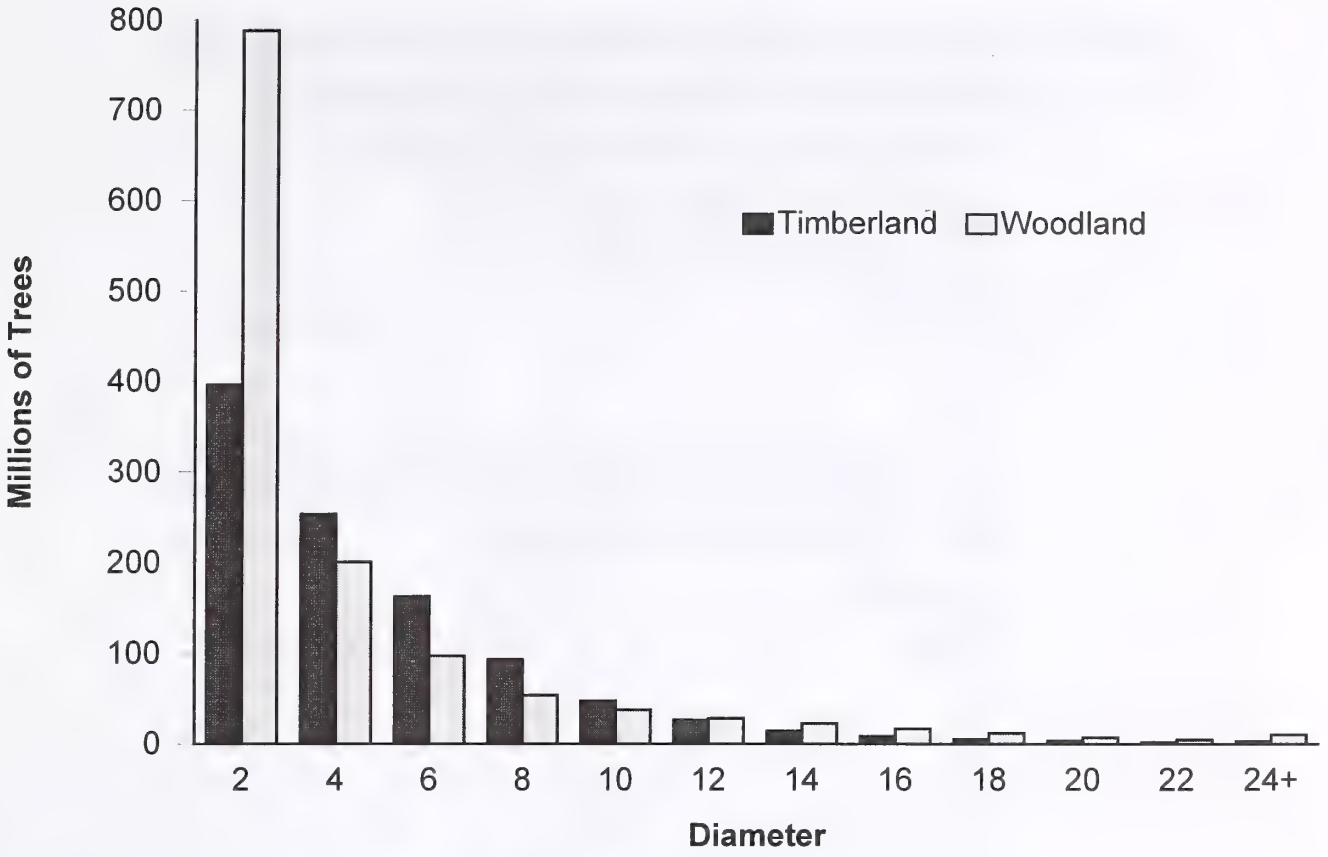


Figure 6—Number of trees by diameter class (d.b.h. for timber species and d.r.c. for woodland species) on forest land in northern Utah. In the woodland numbers, a fraction of the trees in some diameter classes are timber species.

Volume

The net volume of growing stock on timberland totals 3.4 billion cubic ft (table 13). Volume is computed for the merchantable stem from a 1 ft stump to a 4 inch top diameter outside bark (d.o.b.), less deductions for cull volume (Edminster and others 1977; Kemp 1958; Moisen and Chojnacky, in press). Nearly three-fourths of the total growing-stock volume occurs on lands under National Forest System management (table 16). The top five species in volume are Douglas-fir, lodgepole pine, aspen, Engelmann spruce, and subalpine fir (fig. 7). Douglas-fir alone has nearly one-fourth of the volume. However, it is closely followed by lodgepole pine with over one-fifth of the volume, and aspen with nearly a fifth. More than half of the total volume is in trees less than 13 inches d.b.h. (table 19). Also included in the total volume are 11.8 billion board ft of sawtimber based on the International ¼-inch rule (table 24). Timberland volume averages 1,431 cubic ft per acre across northern Utah.

The volume of all species found on woodland totals over 1.5 billion cubic ft. That is less than half the volume found on timberland. Volume for woodland species is computed differently than for timber species (Chojnacky 1985). Woodland volume is calculated for trees 3.0 inches and larger d.r.c. to top diameter of 1.5 inches d.o.b., less deductions for dead, missing, and rotten

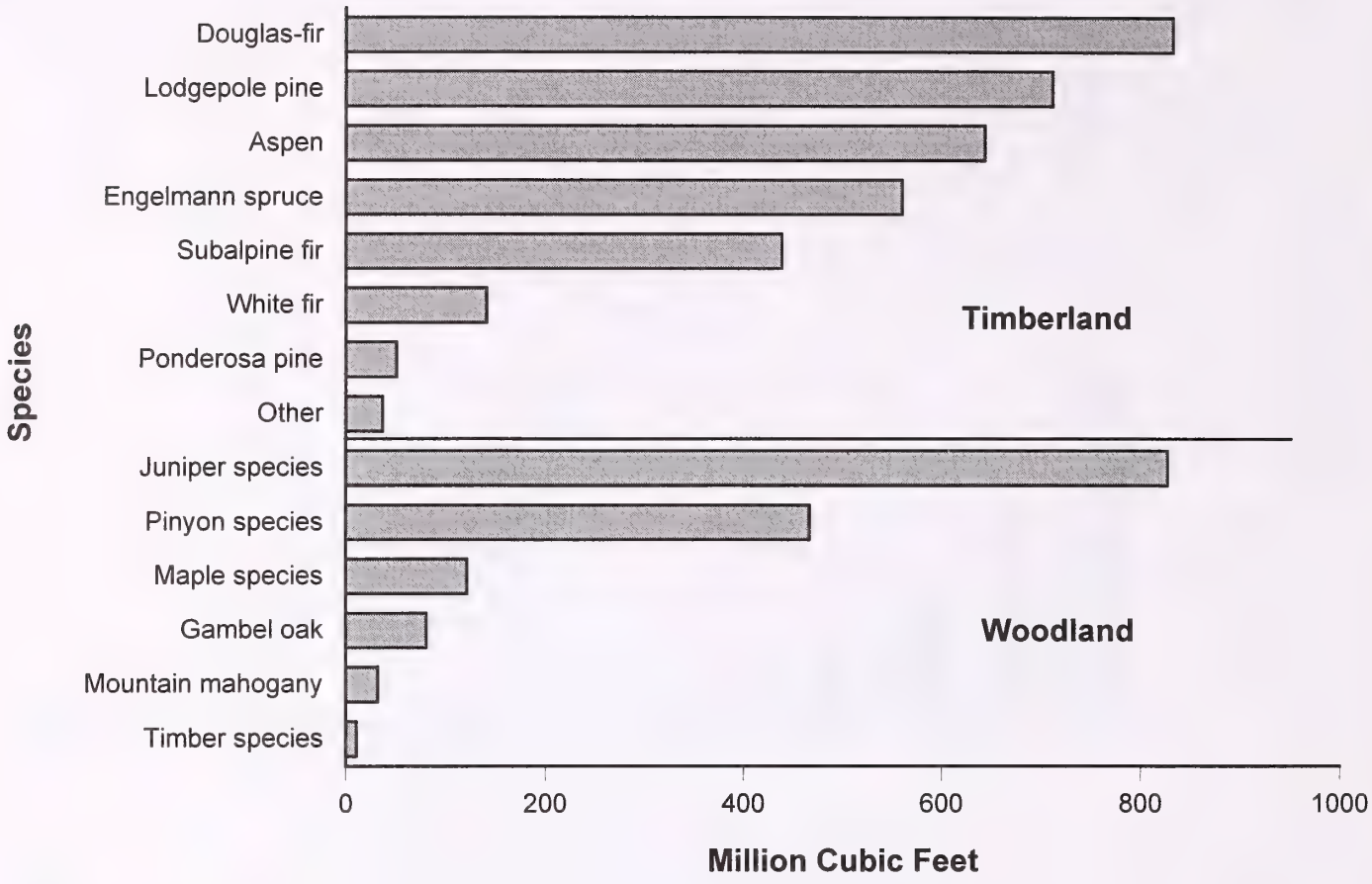


Figure 7—Net cubic-foot volume by species (1 ft stump to 4 inch top d.o.b. for timber species, and 3 inch d.r.c. to 1.5 inch top d.o.b. for woodland species; both less dead, missing, or rotten material) on forest land in northern Utah. Other timberland volume includes limber pine, cottonwood, and bristlecone pine. Less than 1 percent of the woodland volume comes from timber species.

material. Unlike timberland, almost half of the total woodland volume is on other public lands, and more than a third is on private lands (table 44). Only one-sixth of the woodland volume is under National Forest System management. Woodland volume is confined to a limited number of species (fig. 7) and is dominated by two. Juniper species comprise more than half the woodland volume, and pinyon approaches a third of the volume. Woodland volume is widely distributed across the range of diameters, with not quite half of the volume in trees less than 15 inches d.r.c. (table 47). Woodland volume averages 628 cubic ft per acre.

Growth and Mortality

Gross growth of growing stock on timberland averages 86.4 million cubic ft annually. However, mortality reduced gross growth by 55 percent to 38.6 million cubic ft of net annual growth. About two-thirds of the net annual growth occurred on lands under National Forest System management (table 26). In contrast to the diversity of species present, just two species provided most of the net growth on timberland (fig. 8). Aspen accounted for the highest proportion, 42 percent, and Douglas-fir accounted for one-third of the net growth. Most of the total net growth came from smaller diameter

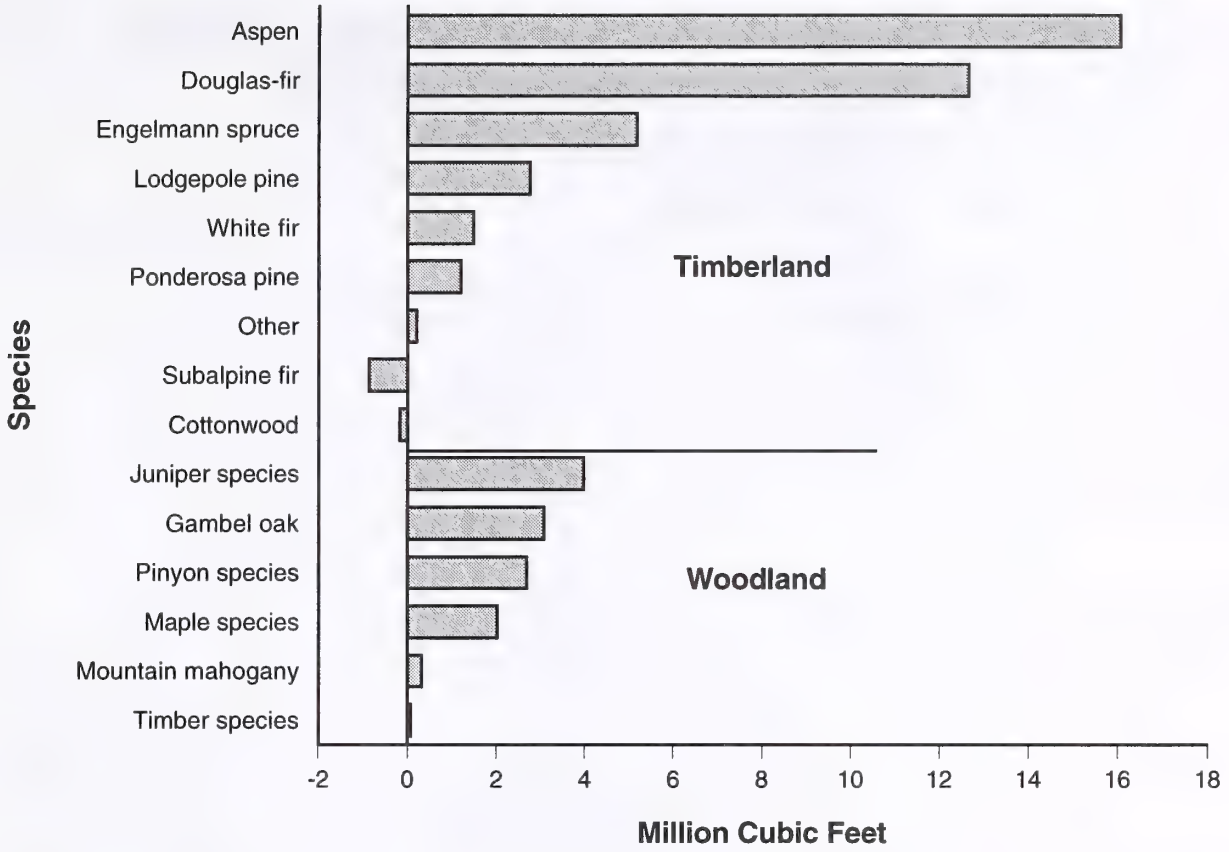


Figure 8—Average net annual growth by species on forest land in northern Utah. Other timberland growth includes bristlecone pine and limber pine. Due to mortality, both cottonwood and subalpine fir resulted in negative growth.

trees, with nearly two-thirds from trees less than 7 inches d.b.h. (table 29). Net annual growth averages 16.1 cubic ft per acre.

Annual mortality of growing stock on timberland averaged 47.9 million cubic ft (table 32). Over three-fourths of the mortality occurred on lands under National Forest System management. Mortality involved many species, but lodgepole pine accounted for the largest portion with one-third of the mortality (fig. 9). Subalpine fir had a significant portion as well, with over one-fourth of the mortality. Next were aspen and Douglas-fir with 15 and 11 percent of the mortality, respectively. Insects caused more than one-half of the mortality and were the leading cause of death in lodgepole pine (table 38). Disease was the next leading cause of death, accounting for one-fifth of the total mortality, and the majority of aspen mortality. Fire caused less than 2 percent of the mortality. Mortality was fairly evenly distributed across all diameter classes (table 35).

Gross growth on woodland averages 13.5 million cubic ft annually. Mortality was less severe on woodland than on timberland, and reduced gross growth by less than 10 percent to 12.2 million cubic ft of net annual growth. The largest proportion, 44 percent, of net growth on woodland occurred on private lands (table 49). Net growth on woodland was more evenly distributed across

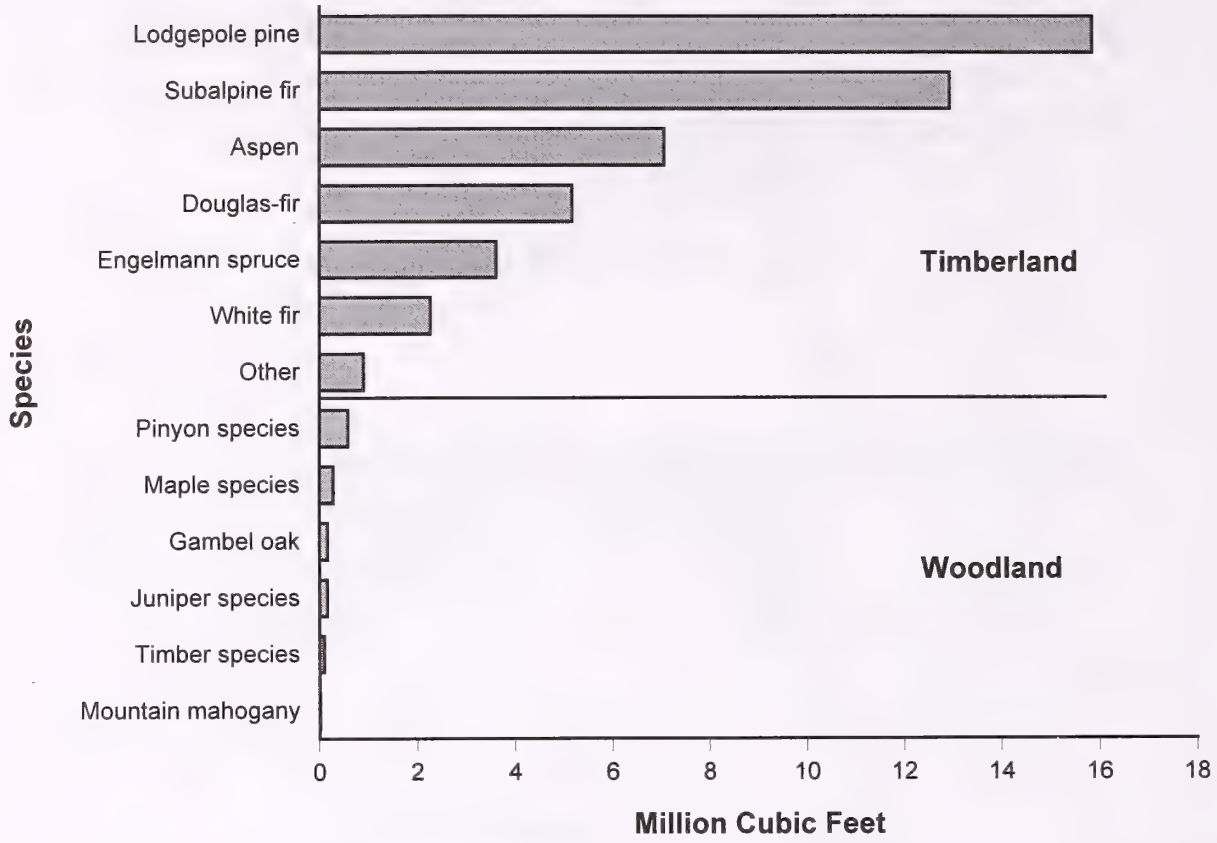


Figure 9—Average annual mortality by species on forest land in northern Utah. Other timberland mortality includes ponderosa pine, limber pine, and cottonwood.

species than on timberland (fig. 8). Junipers accounted for one-third, oaks for one-fourth, and pinyon for less than one-fourth. One-half the net growth came from trees less than 7 inches d.r.c. (table 51). Net annual growth averages 5.0 cubic ft per acre.

Woodland mortality averaged 1.3 million cubic ft annually (table 53). Less than a fourth of the mortality occurred on woodlands under National Forest System management, a third on private woodlands, and the remainder on other public woodlands. With 44 percent, pinyon clearly accounted for more of the woodland mortality than any other species (fig. 9). Juniper had a low percentage of the mortality compared with its high percentage of the volume.

Methods

The inventory was designed to provide reliable statistics at the State or sample area level. Small subsets of the data should be used with caution due to the fact that high variances may be associated with small sample sizes.

Several equations and algorithms are used to build the data set. Both forest type and stand-size class are based on calculations that rely heavily on how well a site is being utilized by trees (Hansen and Hahn 1992). Productivity class is calculated from yield capability equations using data from

height and age site index trees (Brickell 1970). Fewer algorithms and computations have been developed to process and describe woodland data, so woodland descriptions are more directly related to field observations. Where possible, woodland data are presented in formats similar to those used for timberland data.

Inventory Design

The Interior West Resource Inventory, Monitoring, and Evaluation Program uses a two-phase sampling design when conducting Statewide forest surveys. Both phases are based on a grid of points overlaying maps of the State and using random sampling theory. Phase I of the northern Utah survey began in 1990 using a grid spacing of 1,000 m. Ownership and forest land area estimates were initially determined by classifying 85,342 map grid points based on the most recent available land status maps and aerial photographs. The sample points were stratified into owner groups and land classes for field sampling.

Phase II, the field work, was conducted during the summers of 1991 through 1993 using grid spacing of 5,000 m. Land was classified and trees were characterized at 3,075 field locations, of which 1,201 were forested (fig. 10).

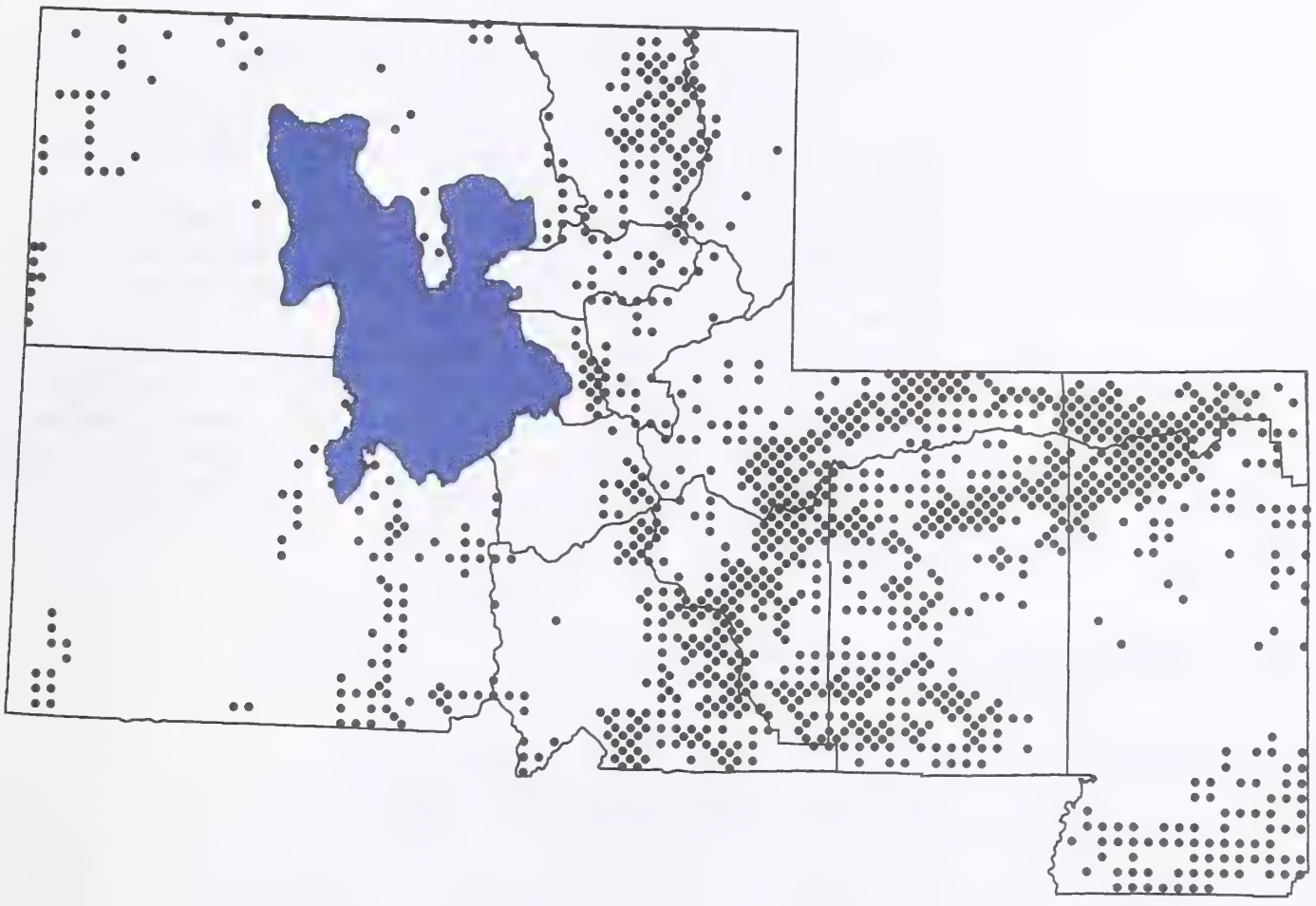


Figure 10—Distribution of forested field sample locations in northern Utah.

Timberland and woodland field plots have different plot designs (USDA Forest Service 1994). Each timberland plot used a cluster of five variable-radius subplots covering about an acre. At each subplot, trees 5.0 inches in diameter at breast height (d.b.h.) and larger were selected for measurement using a 40 basal area factor. Trees between 1.0 inch and 4.9 inches d.b.h. were measured on a 1/300-acre fixed plot centered at each subplot. In addition, established seedlings were counted and grouped by species at each subplot. Any woodland trees encountered were also tallied. In addition, several plot level measurements relating to wildlife, range, recreation, and other resources were collected at each field location.

Each woodland plot was measured using one 1/10-acre fixed circular plot for trees 3.0 inches in diameter at root collar (d.r.c.) and larger, except for oak or maple forest types, where a 1/20-acre fixed circular plot was used instead. Woodland trees less than 3.0 inches d.r.c. were measured using a 1/300-acre fixed circular subplot located within each quadrant of the larger plot. Any timber species encountered were also tallied.

Data Reliability

A measure of reliability of inventory statistics is provided by sampling errors. Sampling errors (in percent) are presented in tables 2 and 3 in terms of one standard error. Percent standard error is given for sample estimates of timberland area and volume, growth, and mortality of growing stock and sawtimber. These sampling errors mean that the chances are two out of three that the true population value is within the ranges of a 67 percent confidence interval around the sample estimate. For example, the confidence interval for total growing-stock volume (in million cubic ft) on nonreserved timberland is: 3,421 ± (0.04 x 3,421) = 3,421 ± 137.

Confidence intervals at the 95 percent level may also be ascertained using methods defined by Cochran (1963). Multiplication of standard error by the number of standard deviations, in this case 1.96, will give the new interval as follows: 3,421 ± 1.96(0.04 x 3,421) = 3,421 ± 268.

Users may compute statistical confidence for subdivisions of the reported data using the formula below. However, sampling error increases as the area or volume considered decreases. Therefore, users should aggregate data cells as much as possible. Sampling errors obtained from this method are only approximations of reliability because this process assumes constant variance across all subdivisions of totals.

The formula is:

$$\widetilde{SE}_g = \frac{SE_t\sqrt{\hat{Y}_t}}{\sqrt{\hat{Y}_g}}$$

where:

$\widetilde{SE}_g$ = approximate percent standard error of $\hat{Y}_g$

SE_t = percent standard error of $\hat{Y}_t$

$\hat{Y}$ = table variable of interest

g = table cell or group of cells of interest

t = totals from tables 2 or 3

For example, the estimate of sampling error for total growing-stock volume (in million cubic feet) on nonreserved timberland under National Forest System management is:

$$\widetilde{SE}_g = \frac{0.04\sqrt{3,421}}{\sqrt{2,523}} = .047$$

Thus, the sampling error is 4.7 percent, and the resulting 67 percent confidence interval for growing-stock volume under National Forest System management is 2,523 ± 119 million cubic ft. The 95 percent confidence interval is 2,523 ± 232.

Standard Forest Survey Terminology

Basal area—The cross-sectional area of a tree expressed in square feet. For timber species the calculation is based on diameter at breast height (d.b.h.); for woodland species it is based on diameter at root collar (d.r.c).

Christmas tree grade—Pinyon species are classified as Christmas trees using the following guidelines:

Premium—Excellent conical form with no gaps in branches and a straight bole.

Standard—Good conical form with small gaps in branches and bole slightly malformed.

Utility—Conical in form with branches missing and bole bent or malformed.

Cull—Not meeting one of the above classifications or over 12 ft in height.

Cord—A stack of wood equivalent to 128 cubic ft of wood and air space having standard dimensions of 4 by 4 by 8 ft. An average conversion factor of 75 cubic ft of solid wood per cord is used.

Crown cover—Percentage of the ground surface covered by a vertical projection of tree crowns. Synonymous with canopy cover

Cull trees—Live timber species trees that are unmerchantable now or prospectively (see Rough trees and Rotten trees).

Cull volume—Portions of the volume in a timber species tree that are not usable for wood products because of rot, missing material, dead material, or other cubic-foot defect.

Diameter at breast height (d.b.h.)—Diameter of the stem measured 4.5 ft above the ground.

Diameter at root collar (d.r.c.)—Diameter equivalent for a woodland species, taken at the point nearest the ground line that represents the basal area of the tree stem or stems.

Diameter classes—Tree diameters, either d.b.h. or d.r.c., grouped into 2 inch classes, with the even inch the midpoint for the class.

Diameter outside bark (d.o.b.)—Tree diameter measurement taken over the bark.

Distance to road—The distance from a sample site to the nearest improved road that could be accessed from the site. Improved roads are permanent maintained roads.

Farmer or rancher-owned lands—Lands owned by a person who operates a farm or a ranch and who either does or directly supervises the work.

Fenceposts—Juniper and oak species are evaluated for post potential using the following criteria:

Line post—A 7 ft minimum length with a 5 to 7 inch diameter butt, 2.5 inch minimum small-end diameter, and reasonably straight and solid.

Corner post—An 8 ft minimum length with a 7 to 9 inch diameter butt, 2.5 inch minimum small-end diameter, and reasonably straight and solid.

Forest industry lands—Lands owned by companies or individuals operating a primary wood-processing plant, either within the State's boundaries or in nearby States or Provinces.

Forest lands—Lands at least 10 percent stocked by forest trees of any size, including lands that formerly had such tree cover and that will be regenerated naturally or artificially. The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of trees must have a crown width of at least 120 ft to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest if they are less than 120 ft wide.

Forest trees—Woody plants having a well-developed stem or stems, usually more than 12 ft tall at maturity, with a generally well-defined crown.

Forest type—A classification of forest land based on and named for the tree species presently forming a plurality of live-tree stocking.

Gross annual growth—The average annual increase in the net volume of trees.

Gross volume in board feet—The board-foot volume in the sawlog portion of a sawtimber tree. Volume is computed from a 1 ft stump to a minimum sawlog top of 7 inches d.o.b. for softwoods, or 9 inches d.o.b. for hardwoods; or to the point where the central stem breaks into limbs.

Growing-stock trees—Live timber species trees meeting specified standards of quality and vigor; excludes cull trees.

Growing-stock volume—Net cubic-foot volume in live poletimber-size and sawtimber-size growing-stock trees from a 1 ft stump to a minimum 4 inch top (of central stem) outside bark or to the point where the central stem breaks into limbs.

Growth—See Net annual growth.

Hardwood trees—Trees that are usually broad leaved and deciduous.

Indian Trust—Indian lands held in trust by the Federal Government for a Native American tribe or individual.

Industrial wood—All commercial roundwood products except fuelwood.

Land area—The area of dry land and land temporarily or partially covered by water such as marshes, swamps, river flood plains, streams, sloughs, estuaries, and canals less than 120 ft wide; and lakes, reservoirs, and ponds less than 1 acre.

Logging residue—The unused portions within the merchantable sections of growing-stock trees cut or killed during logging.

Mill or plant residue—Wood material from mills or other primary manufacturing plants that is not utilized for the mill or plant primary product. Mill or plant residue includes bark, slabs, edgings, trimmings, miscuts, sawdust, and shavings. Much of the mill and plant residue is used as fuel and as the raw material for such products as pulp, pelletized fuel, fiberwood, mulch, and animal bedding. Mill or plant residue includes bark and the following components:

Coarse residue—Wood material suitable for chipping, such as slabs, edgings, and trim.

Fine residue—Wood material unsuitable for chipping, such as sawdust and shavings.

Miscellaneous Federal lands—Lands administered by Federal agencies other than the Forest Service, U.S. Department of Agriculture, or the Bureau of Land Management, U.S. Department of the Interior.

Mortality—The net volume of growing-stock trees that has died from natural causes during a specified period.

National Forest lands—Public lands administered by the Forest Service, U.S. Department of Agriculture.

Net annual growth—Gross annual growth minus average annual mortality.

Net dead volume—For woodland species, net volume of dead trees plus net volume of dead material in live trees.

Net volume in board feet—The gross board-foot volume in the sawlog portion of growing-stock trees, less deductions for cull volume.

Net volume in cubic feet—For timber species, gross cubic-foot volume in the merchantable portion of trees, less deductions for cull volume. Volume is computed for the merchantable stem from a 1 ft stump to a minimum 4 inch top d.o.b., or to the point where the central stem breaks into limbs. For woodland species, gross cubic-foot volume less deductions for dead, missing, and rotten material. Volume is calculated for trees 3.0 inches and larger d.r.c. to a stem or branch top of 1.5 inches d.o.b.

Nonforest lands—Lands that do not currently qualify as forest lands.

Nonindustrial private—All private ownerships except forest industry.

Nonstocked areas—Forest land less than 10 percent stocked with live trees.

Other private lands—Privately owned lands other than forest industry or Indian Trust.

Other public lands—Public lands administered by agencies other than the Forest Service, U.S. Department of Agriculture. Includes lands administered by other Federal, State, county, and local government agencies, including lands leased by these agencies for more than 50 years.

Other removals—The net volume of growing-stock trees removed from the inventory by cultural operations, such as timber-stand improvement, by land clearing, and by changes in land use, such as a shift to wilderness.

Poletimber stands—Stands at least 10 percent stocked with growing-stock trees, in which half or more of the stocking is sawtimber or poletimber trees or both, with poletimber stocking exceeding that of sawtimber (see Stocking).

Poletimber trees—Live timber species trees at least 5 inches d.b.h., but smaller than sawtimber.

Potential growth—The average net annual cubic-foot growth per acre at culmination of mean annual growth attainable in fully stocked natural stands.

Primary wood-processing plants—Plants using roundwood products, such as sawlogs, pulpwood bolts, and veneer logs.

Productivity—Potential yield capability of a stand (in cubic feet per acre per year) calculated here as a function of site index.

Productivity class—A classification of forest land that reflects biological potential. For timberlands, the index used is the potential net annual growth at culmination of mean annual increment in fully stocked natural stands. Woodland is classified as "high site" where sustained wood production is likely, or as "low site" where the continuous production of wood is unlikely.

Removals—The net volume of growing-stock trees removed from the inventory by harvesting, cultural operations, land clearing, and changes in land use.

Reserved forest land—Forest land withdrawn from tree utilization through statute or administrative designation.

Residue—See Mill or plant residue.

Rotten trees—Live poletimber or sawtimber trees with more than 67 percent of the total cubic-foot volume cull and with more than half of the cull volume attributable to rotten or missing material.

Rough trees—Live poletimber or sawtimber trees with more than 67 percent of the total cubic-foot volume cull and with less than half of the cull volume attributable to rotten or missing material.

Roundwood—Logs, bolts, or other round sections cut from trees.

Salvable dead trees—Standing dead timber species trees that meet growing-stock standards.

Saplings—Live timber species trees 1 to 4.9 inches d.b.h. or woodland tree species 1 to 2.9 inches d.r.c.

Sapling and seedling stands—Timberland stands at least 10 percent stocked on which more than half of the stocking is saplings or seedlings, or both.

Sawlog portion—That part of the bole of sawtimber trees between a 1 ft stump and the sawlog top.

Sawlog top—The point on the bole of sawtimber trees above which a sawlog cannot be produced. The minimum sawlog top is 7 inches d.o.b. for softwoods and 9 inches d.o.b. for hardwoods.

Sawtimber stands—Stands at least 10 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Sawtimber trees—Live timber species trees meeting regional size and defect specifications. Softwood trees must be at least 9 inches d.b.h. and hardwood trees 11 inches d.b.h.

Sawtimber volume—Net volume in board feet of the sawlog portion of live sawtimber trees.

Seedlings—Established live timber species trees less than 1 inch d.b.h. or woodland species less than 1 inch d.r.c.

Site index—Expected height (in feet) of a tree on a site at age 50 (or 80 for aspen and cottonwood) calculated from height-to-age equations. Trees selected for site index calculations are dominant or codominant within the stand, age 30 to 200 years, showing high vigor.

Softwood trees—Coniferous trees that are usually evergreen and have scalelike or linear needlelike leaves.

Standard error—An expression of the degree of confidence that can be placed on an estimated total or average obtained by statistical sampling methods. Standard errors do not include technique errors that occur in photo work, field measurements, or compilation.

Stand-size classes—A classification of forest land based on the predominant size of trees present (see Sawtimber stands, Poletimber stands, and Sapling and seedling stands).

Stocking—An expression of the extent to which growing space is effectively utilized by present or potential growing-stock trees.

Stocking condition—A categorization of timberland reflecting the degree to which the site is being utilized by growing-stock trees and other conditions affecting current and prospective timber growth (see Stocking).

Overstocked—Sites at least 60 percent stocked with growing-stock trees, but overstocked with live trees, including live cull trees.

Fully stocked—Sites at least 60 percent stocked with growing-stock trees and not overstocked.

Medium to fully stocked—Sites 35 to 60 percent stocked with growing-stock trees. Includes areas where other trees, inhibiting vegetation, or surface conditions prevent occupancy by growing-stock trees.

Poorly stocked—Sites less than 35 percent stocked with growing-stock trees.

Nonstocked—Forest land less than 10 percent stocked with growing-stock trees.

Mature—Sites with stands older than 100 years.

Timberland—Forest land where timber species make up at least 10 percent stocking.

Timber species—Tree species traditionally used for industrial wood products. In the Interior West States, these include aspen, cottonwood, and paper birch hardwood species, and all softwood species except pinyon and juniper.

Timber stand improvement—Treatments such as thinning, pruning, release cutting, girdling, weeding, or poisoning of unwanted trees to improve growing conditions for the remaining trees.

Upper-stem portion—That part of the main stem or fork of sawtimber trees above the sawlog top to a minimum top diameter of 4 inches outside bark or to the point where the main stem or fork breaks into limbs.

Water—Streams, sloughs, estuaries, and canals more than 120 ft wide, and lakes, reservoirs, and ponds larger than 1 acre at mean high water level.

Wilderness—An area of undeveloped land currently included in the Wilderness System, managed to preserve its natural conditions and retain its primeval character and influence.

Woodland—Forest land where timber species make up less than 10 percent stocking.

Woodland average stand diameter class—A woodland stand classification based on the quadratic mean diameter (the diameter corresponding to the tree of average basal area d.r.c.) of the woodland component of the stand.

Woodland profile—A classification of woodland that combines slope, volume per acre, site class, and tree crown cover.

Woodland species—Tree species not usually converted into industrial wood products. Common uses are fuelwood, fenceposts, and Christmas trees.

References

Brickell, James E. 1970. Equations and computer subroutines for estimating site quality of eight Rocky Mountain species. Res. Pap. INT-75. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 27 p.

Chojnacky, David C. 1985. Pinyon-juniper volume equations for the central Rocky Mountain States. Res. Pap. INT-339. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 27 p.

Cochran, William G. 1963. Sampling techniques. 2d ed. New York: John Wiley and Sons. 413 p.

Edminster, Carleton B.; Getter, James R.; Story, Donna R. 1977. Past diameters and gross volumes of plains cottonwood in eastern Colorado. Res. Note RM-351. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 4 p.

Hansen, Mark H.; Hahn, Jerold T. 1992. Determining stocking, forest type, and stand-size class from forest inventory data. Northern Journal of Applied Forestry. 9: 82-89.

Kemp, Paul D. 1958. Volume tables. Unpublished report on file at: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Forestry Sciences Laboratory, Interior West Resource Inventory, Monitoring, and Evaluation Program, Ogden, UT.

Moisen, Gretchen G.; Chojnacky, David C. [In press]. Total and merchantable cubic-ft volume equations for six tree species in western Montana and northern Idaho. Res. Pap. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

O'Brien, Renee A. 1996. Forest resources of northern Utah ecoregions. Resour. Bull. INT-RB-87. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 34 p.

Powell, Douglas S.; Faulkner, Joanne L.; Darr, David R.; Zhu Zhiliang; MacCleery, Douglas W. 1993. Forest resources of the United States, 1992. Gen. Tech. Rep. RM-234. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 132 p. With separate map.

U.S. Bureau of the Census. 1991. Statistical abstract of the United States (111th edition). Washington, DC: U.S. Department of Commerce.

U.S. Department of Agriculture, Forest Service. 1994. Utah forest survey field procedures, 1994-1995. Unpublished field guide on file at: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Forestry Sciences Laboratory, Interior West Resource Inventory, Monitoring, and Evaluation Program, Ogden, UT. 232 p.

Table 1–Total area by ownership and land class in northern Utah, 1993.

Ownership class	Land class: Nonreserved					Reserved[a]					Total				
	Timberland	Woodland	Nonforest	Water	Total	Timberland	Woodland	Nonforest	Water	Total	Timberland	Woodland	Nonforest	Water	Total Area
	Acres														
Land															
Public															
National Forest	1,580,313	390,830	857,440	2,514	2,831,097	347,053	17,040	262,263	–	626,356	1,927,366	407,870	1,119,703	2,514	3,457,453
Bureau of Land Management	96,999	868,790	4,036,103	–	5,001,892	–	–	–	–	–	96,999	868,790	4,036,103	–	5,001,892
National Park[a]	–	–	–	–	–	8,835	25,689	19,307	–	53,832	8,835	25,689	19,307	–	53,832
Miscellaneous Federal	241	993	19,328	–	20,563	–	–	1,778,623	–	1,778,623	241	993	1,797,951	–	1,799,186
State	94,893	218,331	916,489	–	1,229,713	55	982	23,174	–	24,211	94,948	219,314	939,663	–	1,253,924
County and municipal	1,072	4,120	7,492	–	12,683	–	–	–	–	–	1,072	4,120	7,492	–	12,683
Total public	1,773,518	1,483,064	5,836,851	2,514	9,095,948	355,943	43,712	2,083,367	–	2,483,022	2,129,461	1,526,776	7,920,218	2,514	11,578,970
Private															
Indian Trust	49,579	257,306	531,953	–	838,838	–	–	–	–	–	49,579	257,306	531,953	–	838,838
Other private	567,035	712,874	5,522,869	18,460	6,821,239	–	–	6,512	–	6,512	567,035	712,874	5,529,381	18,460	6,827,751
Total private	616,614	970,180	6,054,823	18,460	7,660,077	–	–	6,512	–	6,512	616,614	970,180	6,061,335	18,460	7,666,589
Total land area	2,390,132	2,453,244	11,891,674	20,975	16,756,025	355,943	43,712	2,089,879	–	2,489,534	2,746,075	2,496,957	13,981,553	20,975	19,245,559
Water	–	–	–	1,682,070	1,682,070	–	–	–	–	–	–	–	–	1,682,070	1,682,070
Total land and water[b]	2,390,132	2,453,244	11,891,674	1,703,045	18,438,095	355,943	43,712	2,089,879	–	2,489,534	2,746,075	2,496,957	13,981,553	1,703,045	20,927,629

[a]Reserved lands are included in tables 1, 2 and 4 only.
[b]Source: U.S. Department of Commerce. 1990 Decennial Census.

Table 2–Area of forest land with percent standard error in northern Utah, 1993.

Item	Acres	Percent standard error
Timberland	2,390,132	±2.3
Woodland	2,453,244	±3.0
Reserved forest land:		
Timberland	355,943	±4.7
Woodland	43,711	±39.0
Total forest land[a]	5,243,030	

[a]On this and all following tables, totals may vary due to rounding.

Table 3–Net volume, net annual growth, and annual mortality of growing stock and sawtimber on timberland with percent standard error in northern Utah.

Item	All species: Volume	Percent standard error
Net volume, 1993:		
Growing stock (M cubic feet)	3,421,476	±4.0
Sawtimber - International ¼-inch rule (M board feet)	11,795,940	±5.0
Sawtimber - Scribner rule (M board feet)	10,080,297	±5.0
Net annual growth, 1992:		
Growing stock (M cubic feet)	38,580	±15.0
Sawtimber - International ¼-inch rule (M board feet)	138,478	±17.9
Sawtimber - Scribner rule (M board feet)	115,929	±18.6
Annual mortality, 1992:		
Growing stock (M cubic feet)	47,868	±9.9
Sawtimber - International ¼-inch rule (M board feet)	174,331	±11.1
Sawtimber - Scribner rule (M board feet)	149,296	±11.1

Table 4–Area of forest land by forest type, owner group, and land class in northern Utah, 1993.

Forest type	Owner group: National Forest			Other public			Nonindustrial private			All owners		
	Nonreserved	Reserved	Total	Nonreserved	Reserved	Total	Nonreserved	Reserved	Total	Nonreserved	Reserved	Total
	Acres											
Douglas-fir	280,740	50,902	331,642	128,756	8,890	137,646	183,434	–	183,434	592,930	59,792	652,722
Ponderosa pine	43,121	4,937	48,058	–	–	–	–	–	–	43,121	4,937	48,058
Lodgepole pine	352,686	111,824	464,509	–	–	–	29,359	–	29,359	382,044	111,824	493,868
Limber pine	13,658	7,138	20,796	2,321	–	2,321	–	–	–	15,979	7,138	23,117
Spruce-fir	276,737	50,443	327,180	7,396	–	7,396	56,403	–	56,403	340,536	50,443	390,980
White fir	66,235	14,912	81,146	13,774	–	13,774	7,540	–	7,540	87,549	14,912	102,461
Engelmann spruce	129,121	100,314	229,435	–	–	–	12,715	–	12,715	141,836	100,314	242,150
Blue spruce	9,669	–	9,669	–	–	–	–	–	–	9,669	–	9,669
Aspen	404,796	6,583	411,380	40,957	–	40,957	318,180	–	318,180	763,934	6,583	770,518
Cottonwood	3,550	–	3,550	–	–	–	8,982	–	8,982	12,533	–	12,533
Total timberland	1,580,313	347,053	1,927,365	193,204	8,890	202,094	616,613	–	616,613	2,390,131	355,943	2,746,076
Pinyon-juniper	128,892	–	128,892	594,837	17,779	612,616	422,321	–	422,321	1,146,050	17,779	1,163,829
Juniper	58,274	17,040	75,314	416,474	8,893	425,367	190,406	–	190,406	665,153	25,933	691,086
Oak	137,397	–	137,397	27,663	–	27,663	248,316	–	248,316	413,376	–	413,376
Mountain mahogany	26,889	–	26,889	45,925	–	45,925	26,261	–	26,261	99,076	–	99,076
Maple woodland	39,377	–	39,377	7,335	–	7,335	82,877	–	82,877	129,589	–	129,589
Total woodland	390,829	17,040	407,869	1,092,234	26,672	1,118,906	970,181	–	970,181	2,453,244	43,712	2,496,956
All types	1,971,143	364,093	2,335,236	1,285,440	35,562	1,321,001	1,586,794	–	1,586,794	4,843,377	399,655	5,243,031

Area

Table 5–Area of timberland by forest type, stand-size class, and productivity class in northern Utah, 1993.

Forest type and stand-size class	Productivity class					
	120-164	85-119	50-84	20-49	0-19	Total
	Acres					
Douglas-fir						
Sawtimber	4,173	28,356	185,679	218,778	–	436,985
Poletimber	–	–	7,847	24,114	–	31,961
Sapling/seedling	–	–	23,805	44,144	5,044	72,993
Nonstocked	–	–	–	50,992	–	50,992
Total	4,173	28,356	217,330	338,028	5,044	592,930
Ponderosa pine						
Sawtimber	–	–	3,300	30,964	–	34,264
Poletimber	–	–	–	5,788	–	5,788
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	3,069	–	3,069
Total	–	–	3,300	39,821	–	43,121
Lodgepole pine						
Sawtimber	–	–	23,702	139,803	–	163,504
Poletimber	–	–	2,719	117,143	6,115	125,977
Sapling/seedling	–	–	3,069	83,125	6,369	92,563
Nonstocked	–	–	–	–	–	–
Total	–	–	29,489	340,071	12,484	382,044
Limber pine						
Sawtimber	–	–	–	15,979	–	15,979
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	15,979	–	15,979
Spruce-fir						
Sawtimber	2,748	50,056	112,868	81,709	–	247,382
Poletimber	–	–	8,935	24,428	–	33,363
Sapling/seedling	–	–	15,784	44,008	–	59,792
Nonstocked	–	–	–	–	–	–
Total	2,748	50,056	137,586	150,145	–	340,536
White fir						
Sawtimber	–	13,827	47,715	12,482	–	74,025
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	7,874	–	–	7,874
Nonstocked	–	–	5,650	–	–	5,650
Total	–	13,827	61,239	12,482	–	87,549
Engelmann spruce						
Sawtimber	–	15,194	33,595	83,729	–	132,517
Poletimber	–	–	2,719	3,300	–	6,019
Sapling/seedling	–	–	3,300	–	–	3,300
Nonstocked	–	–	–	–	–	–
Total	–	15,194	39,614	87,029	–	141,836
Blue spruce						
Sawtimber	–	–	3,069	–	–	3,069
Poletimber	–	–	–	3,069	–	3,069
Sapling/seedling	–	–	–	3,531	–	3,531
Nonstocked	–	–	–	–	–	–
Total	–	–	3,069	6,600	–	9,669
Aspen						
Sawtimber	–	–	19,026	46,009	2,997	68,031
Poletimber	–	1,900	56,640	367,156	71,357	497,053
Sapling/seedling	–	4,173	23,459	130,851	31,590	190,073
Nonstocked	–	–	–	5,754	3,023	8,777
Total	–	6,073	99,125	549,770	108,967	763,934
Cottonwood						
Sawtimber	–	–	–	4,491	4,491	8,982
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	3,550	–	–	3,550
Nonstocked	–	–	–	–	–	–
Total	–	–	3,550	4,491	4,491	12,533
All types						
Sawtimber	6,921	107,433	428,953	633,944	7,488	1,184,739
Poletimber	–	1,900	78,860	544,997	77,472	703,229
Sapling/seedling	–	4,173	80,841	305,659	43,003	433,676
Nonstocked	–	–	5,650	59,815	3,023	68,489
Total	6,921	113,506	594,304	1,544,415	130,986	2,390,132

Table 6–Area of National Forest timberland by forest type, stand-size class, and productivity class in northern Utah, 1993.

Forest type and stand-size class	Productivity class					
	120-164	85-119	50-84	20-49	0-19	Total
	Acres					
Douglas-fir						
Sawtimber	4,173	17,446	112,605	88,239	–	222,464
Poletimber	–	–	3,006	17,097	–	20,103
Sapling/seedling	–	–	8,618	11,576	–	20,193
Nonstocked	–	–	–	17,981	–	17,981
Total	4,173	17,446	124,229	134,892	–	280,740
Ponderosa pine						
Sawtimber	–	–	3,300	30,964	–	34,264
Poletimber	–	–	–	5,788	–	5,788
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	3,069	–	3,069
Total	–	–	3,300	39,821	–	43,121
Lodgepole pine						
Sawtimber	–	–	17,633	122,810	–	140,444
Poletimber	–	–	2,719	110,845	6,115	119,679
Sapling/seedling	–	–	3,069	83,125	6,369	92,563
Nonstocked	–	–	–	–	–	–
Total	–	–	23,421	316,780	12,484	352,686
Limber pine						
Sawtimber	–	–	–	13,658	–	13,658
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	13,658	–	13,658
Spruce-fir						
Sawtimber	2,748	37,821	81,415	81,709	–	203,694
Poletimber	–	–	6,481	24,428	–	30,908
Sapling/seedling	–	–	3,069	39,066	–	42,135
Nonstocked	–	–	–	–	–	–
Total	2,748	37,821	90,964	145,203	–	276,737
White fir						
Sawtimber	–	13,827	41,205	–	–	55,032
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	5,552	–	–	5,552
Nonstocked	–	–	5,650	–	–	5,650
Total	–	13,827	52,407	–	–	66,235
Engelmann spruce						
Sawtimber	–	15,194	33,595	71,014	–	119,802
Poletimber	–	–	2,719	3,300	–	6,019
Sapling/seedling	–	–	3,300	–	–	3,300
Nonstocked	–	–	–	–	–	–
Total	–	15,194	39,614	74,314	–	129,121
Blue spruce						
Sawtimber	–	–	3,069	–	–	3,069
Poletimber	–	–	–	3,069	–	3,069
Sapling/seedling	–	–	–	3,531	–	3,531
Nonstocked	–	–	–	–	–	–
Total	–	–	3,069	6,600	–	9,669
Aspen						
Sawtimber	–	–	19,026	35,258	2,997	57,281
Poletimber	–	1,900	44,056	166,691	12,698	225,345
Sapling/seedling	–	4,173	14,840	79,466	14,915	113,393
Nonstocked	–	–	–	5,754	3,023	8,777
Total	–	6,073	77,921	287,170	33,632	404,796
Cottonwood						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	3,550	–	–	3,550
Nonstocked	–	–	–	–	–	–
Total	–	–	3,550	–	–	3,550
All types						
Sawtimber	6,921	84,289	311,848	443,653	2,997	849,707
Poletimber	–	1,900	58,981	331,217	18,813	410,910
Sapling/seedling	–	4,173	41,998	216,764	21,284	284,218
Nonstocked	–	–	5,650	26,804	3,023	35,477
Total	6,921	90,361	418,477	1,018,438	46,116	1,580,313

Table 7–Area of other publicly owned timberland by forest type, stand-size class, and productivity class in northern Utah, 1993.

Forest type and stand-size class	Productivity class					
	120-164	85-119	50-84	20-49	0-19	Total
	Acres					
Douglas-fir						
Sawtimber	–	–	28,612	56,915	–	85,527
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	23,513	–	23,513
Nonstocked	–	–	–	19,716	–	19,716
Total	–	–	28,612	100,144	–	128,756
Ponderosa pine						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	–	–	–
Lodgepole pine						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	–	–	–
Limber pine						
Sawtimber	–	–	–	2,321	–	2,321
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	2,321	–	2,321
Spruce-fir						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	2,454	–	–	2,454
Sapling/seedling	–	–	–	4,942	–	4,942
Nonstocked	–	–	–	–	–	–
Total	–	–	2,454	4,942	–	7,396
White fir						
Sawtimber	–	–	6,510	4,942	–	11,453
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	2,321	–	–	2,321
Nonstocked	–	–	–	–	–	–
Total	–	–	8,832	4,942	–	13,774
Engelmann spruce						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	–	–	–
Blue spruce						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	–	–	–
Aspen						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	8,132	14,812	5,832	28,776
Sapling/seedling	–	–	2,321	7,406	2,454	12,182
Nonstocked	–	–	–	–	–	–
Total	–	–	10,453	22,218	8,287	40,957
Cottonwood						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	–	–	–
All types						
Sawtimber	–	–	35,122	64,179	–	99,301
Poletimber	–	–	10,586	14,812	5,832	31,230
Sapling/seedling	–	–	4,643	35,861	2,454	42,959
Nonstocked	–	–	–	19,716	–	19,716
Total	–	–	50,351	134,568	8,287	193,205

Table 8–Area of nonindustrial private timberland by forest type, stand-size class, and productivity class in northern Utah, 1993.

Forest type and stand-size class	Productivity class					Total
	120-164	85-119	50-84	20-49	0-19	
	Acres					
Douglas-fir						
Sawtimber	–	10,910	44,461	73,624	–	128,995
Poletimber	–	–	4,841	7,017	–	11,858
Sapling/seedling	–	–	15,187	9,056	5,044	29,286
Nonstocked	–	–	–	13,295	–	13,295
Total	–	10,910	64,490	102,991	5,044	183,434
Ponderosa pine						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	–	–	–
Lodgepole pine						
Sawtimber	–	–	6,068	16,992	–	23,061
Poletimber	–	–	–	6,298	–	6,298
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	6,068	23,290	–	29,359
Limber pine						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	–	–	–
Spruce-fir						
Sawtimber	–	12,235	31,453	–	–	43,688
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	12,715	–	–	12,715
Nonstocked	–	–	–	–	–	–
Total	–	12,235	44,168	–	–	56,403
White fir						
Sawtimber	–	–	–	7,540	–	7,540
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	7,540	–	7,540
Engelmann spruce						
Sawtimber	–	–	–	12,715	–	12,715
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	12,715	–	12,715
Blue spruce						
Sawtimber	–	–	–	–	–	–
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	–	–	–
Aspen						
Sawtimber	–	–	–	10,750	–	10,750
Poletimber	–	–	4,452	185,653	52,827	242,932
Sapling/seedling	–	–	6,298	43,979	14,221	64,498
Nonstocked	–	–	–	–	–	–
Total	–	–	10,750	240,382	67,048	318,180
Cottonwood						
Sawtimber	–	–	–	4,491	4,491	8,982
Poletimber	–	–	–	–	–	–
Sapling/seedling	–	–	–	–	–	–
Nonstocked	–	–	–	–	–	–
Total	–	–	–	4,491	4,491	8,982
All types						
Sawtimber	–	23,144	81,983	126,113	4,491	235,731
Poletimber	–	–	9,294	198,968	52,827	261,089
Sapling/seedling	–	–	34,200	53,034	19,265	106,499
Nonstocked	–	–	–	13,295	–	13,295
Total	–	23,144	125,477	391,410	76,583	616,614

Table 9–Area of timberland by stand volume and owner group in northern Utah, 1993.

Stand volume per acre[a]	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Acres			
Less than 1,500 board feet	565,877	84,187	297,110	947,174
1,500 to 4,999 board feet	359,814	77,385	143,087	580,286
5,000 to 9,999 board feet	340,138	20,181	103,892	464,211
10,000 board feet or more	314,484	11,453	72,524	398,461
Total[a]	1,580,313	193,205	616,614	2,390,132

[a]International ¼-inch rule.

Table 10–Area of timberland by forest type and stocking condition in northern Utah, 1993.

Forest type	Stocking condition						
	Overstocked	Fully stocked	Medium to fully stocked	Poorly stocked	Mature	Nonstocked	Total
	Acres						
Douglas-fir	–	52,498	133,503	115,045	237,592	54,292	592,930
Ponderosa pine	–	–	8,857	14,270	16,926	3,069	43,121
Lodgepole pine	81,779	85,583	95,767	27,846	91,069	–	382,044
Limber pine	–	–	–	–	15,979	–	15,979
Spruce-fir	11,790	49,814	97,734	51,136	130,062	–	340,536
White fir	5,804	8,076	34,464	9,057	24,498	5,650	87,549
Engelmann spruce	–	3,842	11,815	6,306	119,873	–	141,836
Blue spruce	–	–	–	9,669	–	–	9,669
Aspen	59,795	210,396	248,684	208,509	10,904	25,647	763,934
Cottonwood	–	–	3,550	–	8,982	–	12,533
All types	159,168	410,209	634,374	441,839	655,885	88,658	2,390,132

Table 11–Number of growing-stock trees on timberland by species and diameter class in northern Utah, 1993.

Species	Diameter class (inches at breast height)															All classes
	1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand trees															
Douglas-fir	21,748	19,086	12,873	9,658	6,324	6,141	4,461	3,062	1,981	1,428	806	454	418	158	269	88,865
Ponderosa pine	1,658	347	1,712	1,173	234	333	125	309	69	84	107	53	39	36	20	6,300
Lodgepole pine	88,144	65,370	40,071	21,841	12,351	5,502	2,559	1,011	521	239	74	–	12	5	–	237,700
Bristlecone pine	–	–	–	–	–	–	–	–	38	–	–	–	–	–	–	38
Limber pine	361	885	749	318	39	79	125	103	26	87	33	39	–	8	43	2,895
Subalpine fir	92,730	33,740	17,214	10,488	7,240	3,343	1,826	1,286	792	532	244	80	115	53	33	169,716
White fir	6,149	4,526	2,726	1,604	1,520	1,174	654	448	587	171	165	83	30	27	83	19,947
Engelmann spruce	16,966	14,343	7,801	5,804	4,308	4,205	2,751	1,780	1,007	1,021	650	409	181	105	145	61,477
Blue spruce	1,100	548	390	337	45	55	46	31	–	21	17	7	13	6	7	2,624
Softwood total	228,856	138,845	83,536	51,223	32,061	20,832	12,547	8,030	5,020	3,584	2,097	1,125	807	398	601	589,561
Aspen	167,307	114,535	79,468	42,157	15,639	5,976	1,927	554	161	43	13	13	–	–	–	427,791
Cottonwood	–	–	–	–	32	28	63	57	22	22	18	62	10	18	29	361
Hardwood total	167,307	114,535	79,468	42,157	15,671	6,004	1,990	611	183	65	31	74	10	18	29	428,152
All species	396,163	253,380	163,004	93,380	47,731	26,837	14,536	8,640	5,203	3,648	2,127	1,199	817	417	631	1,017,714

Table 12–Number of cull and salvable dead trees on timberland by owner group, and softwoods and hardwoods in northern Utah, 1993.

Owner group	Species group	Cull trees			Salvable dead trees	Total
		Rough	Rotten	Total		
		Thousand trees				
National Forest	Softwoods	1,927	377	2,304	50,811	53,116
	Hardwoods	869	2,109	2,978	–	2,978
	Total	2,796	2,487	5,283	50,811	56,094
Other public	Softwoods	300	–	300	926	1,226
	Hardwoods	714	222	936	–	936
	Total	1,014	222	1,236	926	2,162
Nonindustrial private	Softwoods	1,074	105	1,179	3,989	5,168
	Hardwoods	3,222	1,310	4,532	–	4,532
	Total	4,295	1,416	5,711	3,989	9,700
Total	Softwoods	3,301	482	3,783	55,727	59,510
	Hardwoods	4,805	3,641	8,446	–	8,446
	Total	8,106	4,124	12,229	55,727	67,956

Table 13–Net volume of growing stock on timberland by forest type and stand-size class in northern Utah, 1993.

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand cubic feet				
Douglas-fir	775,544	40,966	28,429	5,371	850,311
Ponderosa pine	33,407	5,969	–	645	40,021
Lodgepole pine	429,344	212,084	37,049	–	678,477
Limber pine	12,907	–	–	–	12,907
Spruce-fir	630,770	25,577	26,113	–	682,461
White fir	139,965	–	5,724	1,593	147,282
Engelmann spruce	313,957	15,802	407	–	330,166
Blue spruce	3,342	1,105	867	–	5,314
Aspen	102,567	516,757	48,998	435	668,757
Cottonwood	5,331	–	451	–	5,781
All types	2,447,134	818,259	148,039	8,045	3,421,476

Table 14–Net volume of sawtimber (International ¼-inch rule) on timberland by forest type and stand-size class in northern Utah, 1993.

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand board feet				
Douglas-fir	3,566,076	88,381	115,699	23,366	3,793,522
Ponderosa pine	153,715	14,946	–	2,967	171,628
Lodgepole pine	1,552,392	241,816	39,464	–	1,833,673
Limber pine	61,255	–	–	–	61,255
Spruce-fir	2,659,571	44,264	84,787	–	2,788,622
White fir	574,672	–	24,985	6,508	606,165
Engelmann spruce	1,402,877	38,489	–	–	1,441,367
Blue spruce	17,762	2,605	–	–	20,367
Aspen	357,676	582,029	113,042	–	1,052,748
Cottonwood	24,325	–	2,269	–	26,595
All types	10,370,323	1,012,531	380,246	32,841	11,795,940

Table 15–Net volume of sawtimber (Scribner rule) on timberland by forest type and stand-size class in northern Utah, 1993.

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	Thousand board feet				
Douglas-fir	3,043,791	74,701	99,148	20,646	3,238,285
Ponderosa pine	134,124	13,138	–	2,518	149,780
Lodgepole pine	1,322,873	206,943	33,910	–	1,563,726
Limber pine	53,253	–	–	–	53,253
Spruce-fir	2,281,920	38,510	73,145	–	2,393,574
White fir	486,708	–	21,197	5,404	513,308
Engelmann spruce	1,192,652	32,492	–	–	1,225,144
Blue spruce	15,749	2,122	–	–	17,870
Aspen	306,812	497,491	97,719	–	902,022
Cottonwood	21,447	–	1,888	–	23,334
All types	8,859,327	865,397	327,006	28,567	10,080,297

Table 16–Net volume of growing stock on timberland by species and owner group in northern Utah, 1993.

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Douglas-fir	474,197	92,396	267,760	834,354
Ponderosa pine	47,994	1,853	839	50,686
Lodgepole pine	631,749	559	81,047	713,356
Bristlecone pine	–	1,628	–	1,628
Limber pine	14,709	3,057	4,780	22,545
Subalpine fir	331,913	8,457	98,924	439,294
White fir	104,175	14,456	22,552	141,183
Engelmann spruce	521,368	–	26,982	548,350
Blue spruce	11,582	–	1,024	12,606
Softwood total	2,137,687	122,406	503,909	2,764,002
Aspen	384,198	19,780	240,767	644,745
Cottonwood	1,100	–	11,631	12,730
Hardwood total	385,297	19,780	252,397	657,475
All species	2,522,985	142,186	756,306	3,421,476

Table 17–Net volume of sawtimber (International ¼-inch rule) on timberland by species and owner group in northern Utah, 1993.

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Douglas-fir	2,239,542	419,556	1,260,490	3,919,588
Ponderosa pine	210,172	9,888	4,535	224,595
Lodgepole pine	1,619,173	2,286	348,616	1,970,075
Bristlecone pine	–	8,389	–	8,389
Limber pine	66,226	15,016	21,951	103,193
Subalpine fir	1,217,362	33,617	394,875	1,645,855
White fir	429,010	56,757	91,005	576,772
Engelmann spruce	2,371,406	–	133,738	2,505,144
Blue spruce	49,358	–	5,027	54,385
Softwood total	8,202,249	545,509	2,260,237	11,007,995
Aspen	519,335	11,556	199,491	730,381
Cottonwood	4,237	–	53,327	57,564
Hardwood total	523,571	11,556	252,818	787,945
All species	8,725,820	557,064	2,513,056	11,795,940

Table 18–Net volume of sawtimber (Scribner rule) on timberland by species and owner group in northern Utah, 1993.

Species	Owner group			
	National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Douglas-fir	1,911,950	359,494	1,074,810	3,346,253
Ponderosa pine	183,560	8,722	4,023	196,305
Lodgepole pine	1,379,984	1,956	297,000	1,678,940
Bristlecone pine	–	7,104	–	7,104
Limber pine	57,571	12,894	19,576	90,041
Subalpine fir	1,032,980	28,670	338,643	1,400,293
White fir	365,438	47,345	78,284	491,067
Engelmann spruce	2,035,374	–	113,711	2,149,085
Blue spruce	43,892	–	4,097	47,989
Softwood total	7,010,749	466,183	1,930,146	9,407,078
Aspen	441,829	9,720	170,563	622,112
Cottonwood	3,477	–	47,630	51,108
Hardwood total	445,307	9,720	218,193	673,219
All species	7,456,055	475,903	2,148,339	10,080,297

Table 19–Net volume of growing stock on timberland by species and diameter class in northern Utah, 1993.

Species	Diameter class (inches at breast height)													All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Douglas-fir	26,854	51,237	62,385	103,211	110,505	113,886	92,869	82,803	54,833	37,906	39,203	17,120	41,542	834,354
Ponderosa pine	2,812	3,850	1,678	4,186	1,840	8,112	2,406	4,260	6,619	4,298	3,530	4,155	2,940	50,686
Lodgepole pine	114,032	163,391	167,172	114,228	70,022	40,524	24,594	12,882	4,630	–	1,164	719	–	713,356
Bristlecone pine	–	–	–	–	–	–	1,628	–	–	–	–	–	–	1,628
Limber pine	389	1,519	378	1,125	2,257	2,617	973	3,014	1,539	2,422	–	639	5,674	22,545
Subalpine fir	36,011	57,867	81,829	60,772	47,225	46,506	37,139	28,776	16,328	6,113	10,062	5,807	4,859	439,294
White fir	4,296	8,284	14,074	19,773	15,104	14,837	23,444	9,027	9,912	6,331	2,372	2,578	11,151	141,183
Engelmann spruce	15,467	30,278	45,376	73,780	72,091	66,460	50,116	59,383	46,670	33,790	17,685	12,953	24,301	548,350
Blue spruce	604	1,564	191	862	1,537	1,024	–	1,507	1,324	599	1,455	752	1,187	12,606
Softwood total	200,463	317,989	373,083	377,938	320,581	293,967	233,168	201,651	141,855	91,459	75,471	44,722	91,654	2,764,002
Aspen	139,712	207,238	146,460	88,179	39,704	14,935	5,418	1,760	615	724	–	–	–	644,745
Cottonwood	–	–	266	383	817	1,208	547	810	979	3,164	517	1,454	2,584	12,730
Hardwood total	139,712	207,238	146,726	88,562	40,521	16,144	5,965	2,570	1,594	3,887	517	1,454	2,584	657,475
All species	340,175	525,227	519,809	466,500	361,102	310,111	239,133	204,221	143,449	95,346	75,988	46,176	94,239	3,421,476

Table 20–Net volume of sawtimber (International ¼-inch rule) on timberland by species and diameter class in northern Utah, 1993.

Species	Diameter class (inches at breast height)											All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Douglas-fir	241,447	483,734	556,274	599,705	497,233	451,618	304,675	215,947	225,202	99,216	244,536	3,919,588
Ponderosa pine	5,321	17,925	8,285	41,156	12,584	22,790	35,676	23,236	19,091	22,548	15,983	224,595
Lodgepole pine	656,739	523,114	348,764	212,263	127,845	66,746	24,281	–	6,351	3,973	–	1,970,075
Bristlecone pine	–	–	–	–	8,389	–	–	–	–	–	–	8,389
Limber pine	1,244	4,446	9,685	12,437	4,902	14,883	7,912	12,835	–	3,463	31,385	103,193
Subalpine fir	334,220	283,329	230,157	230,988	185,812	145,095	85,295	32,882	55,763	33,308	29,005	1,645,855
White fir	52,549	90,956	71,851	70,646	108,371	40,130	42,851	27,336	10,170	11,290	50,622	576,772
Engelmann spruce	179,967	341,575	352,658	332,903	253,262	303,853	245,075	182,038	97,627	73,686	142,498	2,505,144
Blue spruce	223	3,870	7,770	5,027	–	7,887	7,004	3,213	8,161	4,260	6,972	54,385
Softwood total	1,471,711	1,748,947	1,585,445	1,505,125	1,198,399	1,053,002	752,768	497,488	422,364	251,745	521,001	11,007,995
Aspen	XXXXX[a]	414,907	196,674	75,830	27,495	8,880	3,035	3,560	–	–	–	730,381
Cottonwood	XXXXX	1,967	4,068	5,879	2,643	3,768	4,460	14,185	2,289	6,564	11,740	57,564
Hardwood total	XXXXX	416,875	200,742	81,709	30,138	12,648	7,495	17,745	2,289	6,564	11,740	787,945
All species	1,471,711	2,165,822	1,786,186	1,586,834	1,228,537	1,065,650	760,264	515,232	424,653	258,309	532,741	11,795,940

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 21–Net volume of sawtimber (Scribner rule) on timberland by species and diameter class in northern Utah, 1993.

Species	Diameter class (inches at breast height)											All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Douglas-fir	216,692	410,419	460,066	487,321	408,094	381,798	265,746	193,162	203,562	90,907	228,487	3,346,253
Ponderosa pine	4,141	14,898	6,991	35,776	11,026	20,104	31,552	20,607	16,945	20,043	14,223	196,305
Lodgepole pine	564,868	443,074	293,325	179,274	109,754	57,951	21,351	–	5,723	3,621	–	1,678,940
Bristlecone pine	–	–	–	–	7,104	–	–	–	–	–	–	7,104
Limber pine	1,096	3,816	8,234	10,429	4,153	12,567	6,786	11,284	–	3,091	28,586	90,041
Subalpine fir	296,625	238,745	189,549	187,525	152,607	122,225	74,922	29,460	50,667	30,765	27,204	1,400,293
White fir	47,470	77,192	59,534	57,537	87,682	33,517	37,049	24,378	9,137	10,333	47,237	491,067
Engelmann spruce	160,940	289,083	290,498	270,729	207,954	259,437	216,267	163,180	88,951	68,202	133,844	2,149,085
Blue spruce	198	3,310	6,334	4,097	–	6,939	6,224	2,882	7,512	3,941	6,552	47,989
Softwood total	1,292,030	1,480,538	1,314,529	1,232,688	988,374	894,538	659,897	444,952	382,496	230,903	486,133	9,407,078
Aspen	XXXXX[a]	355,533	166,093	63,961	23,323	7,564	2,592	3,046	–	–	–	622,112
Cottonwood	XXXXX	1,590	3,298	5,015	2,277	3,309	4,015	12,708	2,058	6,023	10,813	51,108
Hardwood total	XXXXX	357,123	169,391	68,977	25,600	10,873	6,606	15,754	2,058	6,023	10,813	673,219
All species	1,292,030	1,837,660	1,483,920	1,301,665	1,013,974	905,411	666,503	460,706	384,554	236,926	496,946	10,080,297

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 22–Net volume of timber on timberland by class of timber, and softwoods and hardwoods in northern Utah, 1993.

Class of timber	Softwoods	Hardwoods	Total
	Thousand cubic feet		
Sawtimber trees			
Sawlog portion	2,015,389	121,766	2,137,155
Upper-stem portion	230,160	42,033	272,193
Total	2,245,549	163,799	2,409,348
Poletimber trees	518,452	493,676	1,012,128
All growing-stock trees	2,764,001	657,475	3,421,476
Rough cull trees	12,793	5,162	17,955
Rotten cull trees	5,635	4,204	9,839
Salvable dead trees	438,432	–	438,432
All timber	3,220,862	666,840	3,887,702

Table 23–Net volume of growing stock on timberland by forest type and species in northern Utah, 1993.

Forest type	Species											All species
	Douglas-fir	Ponderosa pine	Lodgepole pine	Bristlecone pine	Limber pine	Subalpine fir	White fir	Engelmann spruce	Blue spruce	Aspen	Cottonwood	
	Thousand cubic feet											
Douglas-fir	716,491	7,432	8,081	–	10,792	40,954	34,424	4,246	3,483	24,408	–	850,311
Ponderosa pine	–	39,756	–	–	–	–	–	–	–	265	–	40,021
Lodgepole pine	3,051	–	598,542	–	–	23,933	–	42,196	291	10,464	–	678,477
Limber pine	2,636	–	–	–	9,125	454	–	693	–	–	–	12,907
Spruce-fir	36,305	–	49,195	–	63	309,072	2,931	236,436	4,594	37,564	6,300	682,461
White fir	36,107	–	–	1,628	1,012	–	97,233	395	–	10,906	–	147,282
Engelmann spruce	7,940	–	35,598	–	1,552	16,244	–	263,131	–	5,701	–	330,166
Blue spruce	1,156	751	–	–	–	–	–	–	3,407	–	–	5,314
Aspen	30,668	2,748	21,940	–	–	48,637	6,595	1,254	831	555,436	649	668,757
Cottonwood	–	–	–	–	–	–	–	–	–	–	5,781	5,781
All types	834,354	50,686	713,356	1,628	22,545	439,294	141,183	548,350	12,606	644,745	12,730	3,421,476

Table 24–Net volume of sawtimber (International ¼-inch rule) on timberland by forest type and species in northern Utah, 1993.

Forest type	Species											All species
	Douglas-fir	Ponderosa pine	Lodgepole pine	Bristlecone pine	Limber pine	Subalpine fir	White fir	Engelmann spruce	Blue spruce	Aspen	Cottonwood	
	Thousand board feet											
Douglas-fir	3,347,625	34,741	6,270	–	46,495	165,653	139,944	21,341	15,966	15,488	–	3,793,522
Ponderosa pine	–	171,628	–	–	–	–	–	–	–	–	–	171,628
Lodgepole pine	14,326	–	1,583,764	–	–	56,196	–	174,715	–	4,672	–	1,833,673
Limber pine	13,901	–	–	–	44,770	1,800	–	783	–	–	–	61,255
Spruce-fir	178,487	–	167,651	–	–	1,166,075	12,384	1,123,425	23,792	87,804	29,002	2,788,622
White fir	179,081	–	–	8,389	4,477	–	401,890	1,368	–	10,960	–	606,165
Engelmann spruce	42,249	–	151,325	–	7,450	55,892	–	1,177,673	–	6,778	–	1,441,367
Blue spruce	5,891	4,089	–	–	–	–	–	–	10,387	–	–	20,367
Aspen	138,028	14,136	61,066	–	–	200,239	22,554	5,839	4,240	604,678	1,967	1,052,748
Cottonwood	–	–	–	–	–	–	–	–	–	–	26,595	26,595
All types	3,919,588	224,595	1,970,075	8,389	103,193	1,645,855	576,772	2,505,144	54,385	730,381	57,564	11,795,940

Table 25–Net volume of sawtimber (Scribner rule) on timberland by forest type and species in northern Utah, 1993.

Forest type	Species											All species
	Douglas-fir	Ponderosa pine	Lodgepole pine	Bristlecone pine	Limber pine	Subalpine fir	White fir	Engelmann spruce	Blue spruce	Aspen	Cottonwood	
	Thousand board feet											
Douglas-fir	2,857,898	30,496	5,478	–	40,998	139,479	119,006	18,012	13,653	13,264	–	3,238,285
Ponderosa pine	–	149,780	–	–	–	–	–	–	–	–	–	149,780
Lodgepole pine	12,514	–	1,350,119	–	–	48,883	–	148,199	–	4,010	–	1,563,726
Limber pine	12,361	–	–	–	38,747	1,628	–	518	–	–	–	53,253
Spruce-fir	153,123	–	142,716	–	–	992,116	10,105	974,023	21,105	74,203	26,184	2,393,574
White fir	149,777	–	–	7,104	3,791	–	341,919	1,311	–	9,406	–	513,308
Engelmann spruce	34,796	–	128,874	–	6,506	47,131	–	1,002,173	–	5,663	–	1,225,144
Blue spruce	4,846	3,633	–	–	–	–	–	–	9,392	–	–	17,870
Aspen	120,938	12,396	51,752	–	–	171,056	20,037	4,849	3,839	515,565	1,590	902,022
Cottonwood	–	–	–	–	–	–	–	–	–	–	23,334	23,334
All types	3,346,253	196,305	1,678,940	7,104	90,041	1,400,293	491,067	2,149,085	47,989	622,112	51,108	10,080,297

Table 26–Net annual growth of growing stock on timberland by species and owner group in northern Utah, 1992.

Species	Owner group: National Forest	Other public	Nonindustrial private	Total
	Thousand cubic feet			
Douglas-fir	6,051	1,031	5,585	12,666
Ponderosa pine	1,172	35	5	1,211
Lodgepole pine	2,907	18	−151	2,774
Bristlecone pine	–	19	–	19
Limber pine	94	36	65	195
Subalpine fir	−806	46	−108	−867
White fir	1,728	137	−362	1,503
Engelmann spruce	5,419	–	−460	4,959
Blue spruce	198	–	33	232
Softwood total	16,763	1,322	4,607	22,691
Aspen	8,383	236	7,445	16,064
Cottonwood	17	–	−191	−175
Hardwood total	8,400	236	7,254	15,889
All species	25,163	1,557	11,860	38,580

Table 27–Net annual growth of sawtimber (International ¼-inch rule) on timberland by species and owner group in northern Utah, 1992.

Species	Owner group: National Forest	Other public	Nonindustrial private	Total
	Thousand board feet			
Douglas-fir	34,260	3,378	27,685	65,323
Ponderosa pine	3,194	196	26	3,416
Lodgepole pine	19,647	95	−3	19,739
Bristlecone pine	–	99	–	99
Limber pine	259	203	172	635
Subalpine fir	−2,349	86	2,636	374
White fir	6,912	430	−1,434	5,908
Engelmann spruce	28,213	–	−1,892	26,322
Blue spruce	−121	–	174	52
Softwood total	90,016	4,486	27,365	121,867
Aspen	13,092	201	4,186	17,479
Cottonwood	48	–	−916	−868
Hardwood total	13,140	201	3,270	16,611
All species	103,156	4,687	30,634	138,478

Table 28–Net annual growth of sawtimber (Scribner rule) on timberland by species and owner group in northern Utah, 1992.

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand board feet			
Douglas-fir	29,066	2,778	22,959	54,803
Ponderosa pine	2,891	175	23	3,089
Lodgepole pine	17,173	79	−151	17,101
Bristlecone pine	–	94	–	94
Limber pine	212	184	159	556
Subalpine fir	−2,502	64	1,900	−538
White fir	5,472	282	−1,241	4,513
Engelmann spruce	23,826	–	−1,706	22,120
Blue spruce	−105	–	136	31
Softwood total	76,033	3,656	22,081	101,770
Aspen	11,126	173	3,605	14,904
Cottonwood	44	–	−788	−744
Hardwood total	11,170	173	2,816	14,159
All species	87,202	3,829	24,898	115,929

Table 29–Net annual growth of growing stock on timberland by species and diameter class in northern Utah, 1992.

Species	Diameter class (inches at breast height)													All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Douglas-fir	1,996	1,991	1,612	1,837	1,710	1,526	816	691	174	−162	181	205	88	12,666
Ponderosa pine	445	271	105	102	−3	154	40	55	78	50	21	26	−132	1,211
Lodgepole pine	7,818	657	−941	168	−1,361	−1,438	−1,574	−270	39	−334	6	3	–	2,774
Bristlecone pine	–	–	–	–	–	–	19	–	–	–	–	–	–	19
Limber pine	80	61	10	−90	40	43	14	25	24	30	–	7	−49	195
Subalpine fir	1,830	1,225	−103	−137	−1,877	−251	−396	−144	61	−822	−43	37	−245	−867
White fir	368	320	267	162	44	37	138	−64	131	−72	29	21	123	1,503
Engelmann spruce	1,300	781	492	1,132	605	428	280	−13	−242	176	10	−8	20	4,959
Blue spruce	182	54	7	52	18	33	–	29	22	6	−199	16	10	232
Softwood total	14,018	5,361	1,449	3,226	−824	532	−664	308	286	−1,129	5	307	−185	22,691
Aspen	10,046	3,915	1,995	658	−27	−201	−262	−78	11	7	–	–	–	16,064
Cottonwood	–	–	7	5	7	17	7	−195	11	35	4	17	−90	−175
Hardwood total	10,046	3,915	2,002	663	−20	−184	−255	−273	22	42	4	17	−90	15,889
All species	24,065	9,277	3,452	3,889	−844	349	−920	35	308	−1,087	9	324	−275	38,580

Table 30–Net annual growth of sawtimber (International ¼-inch rule) on timberland by species and diameter class in northern Utah, 1992.

Species	Diameter class (inches at breast height)											All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Douglas-fir	21,323	11,371	10,413	8,921	5,038	4,393	1,427	−648	1,223	1,260	603	65,323
Ponderosa pine	967	727	54	888	226	306	433	275	116	144	−720	3,416
Lodgepole pine	39,860	3,821	−5,468	−7,334	−8,243	−1,367	221	−1,807	35	20	–	19,739
Bristlecone pine	–	–	–	–	99	–	–	–	–	–	–	99
Limber pine	55	−226	244	252	81	139	139	173	–	39	−261	635
Subalpine fir	16,613	915	−8,487	−936	−1,976	−513	493	−4,367	−160	239	−1,446	374
White fir	2,916	1,317	326	159	454	−363	548	−284	133	101	601	5,908
Engelmann spruce	11,828	6,373	3,401	2,341	1,521	170	−904	1,209	175	43	165	26,322
Blue spruce	42	288	96	174	–	170	137	36	−1,060	105	65	52
Softwood total	93,602	24,586	580	4,465	−2,801	2,934	2,493	−5,413	462	1,952	−993	121,867
Aspen	XXXXX[a]	19,908	145	−956	−1,294	−406	50	32	–	–	–	17,479
Cottonwood	XXXXX	29	32	74	29	−916	48	151	17	79	−411	−868
Hardwood total	XXXXX	19,937	177	−882	−1,265	−1,322	99	183	17	79	−411	16,611
All species	93,602	44,523	756	3,583	−4,066	1,612	2,592	−5,230	479	2,031	−1,404	138,478

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 31–Net annual growth of sawtimber (Scribner rule) on timberland by species and diameter class in northern Utah, 1992.

Species	Diameter class (inches at breast height)											All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Douglas-fir	18,479	8,796	8,050	6,936	4,091	4,085	1,601	−369	1,266	1,231	636	54,803
Ponderosa pine	862	672	61	795	202	274	387	246	104	129	−641	3,089
Lodgepole pine	34,259	3,042	−4,645	−5,966	−7,081	−1,140	207	−1,626	33	18	–	17,101
Bristlecone pine	–	–	–	–	94	–	–	–	–	–	–	94
Limber pine	45	−208	202	217	72	128	131	162	–	37	−229	556
Subalpine fir	14,064	222	−7,262	−912	−1,719	−337	532	−3,896	−114	232	−1,350	−538
White fir	2,289	910	186	66	314	−332	475	−209	130	99	585	4,513
Engelmann spruce	10,051	4,976	2,598	1,783	1,259	302	−536	1,210	216	82	178	22,120
Blue spruce	37	226	76	136	–	167	134	35	−946	102	63	31
Softwood total	80,087	18,635	−733	3,055	−2,769	3,148	2,932	−4,447	690	1,930	−758	101,770
Aspen	XXXXX[a]	16,891	164	−787	−1,091	−345	44	27	–	–	–	14,904
Cottonwood	XXXXX	26	30	69	27	−796	47	142	16	75	−379	−744
Hardwood total	XXXXX	16,918	194	−718	−1,064	−1,141	90	169	16	75	−379	14,159
All species	80,087	35,553	−540	2,337	−3,833	2,007	3,022	−4,278	706	2,005	−1,137	115,929

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Mortality

Table 32–Annual mortality of growing stock on timberland by species and owner group in northern Utah, 1992.

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Douglas-fir	3,672	1,279	232	5,184
Ponderosa pine	384	–	–	384
Lodgepole pine	14,649	–	1,224	15,873
Bristlecone pine	–	–	–	–
Limber pine	211	–	–	211
Subalpine fir	9,663	94	3,192	12,949
White fir	1,168	215	884	2,268
Engelmann spruce	2,464	–	924	3,388
Blue spruce	227	–	–	227
Softwood total	32,440	1,588	6,457	40,484
Aspen	4,035	458	2,584	7,077
Cottonwood	–	–	307	307
Hardwood total	4,035	458	2,891	7,384
All species	36,474	2,046	9,348	47,868

Table 33–Annual mortality of sawtimber (International ¼-inch rule) on timberland by species and owner group in northern Utah, 1992.

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand board feet			
Douglas-fir	18,273	6,390	1,237	25,900
Ponderosa pine	1,621	–	–	1,621
Lodgepole pine	48,198	–	5,293	53,491
Bristlecone pine	–	–	–	–
Limber pine	893	–	–	893
Subalpine fir	39,284	437	14,538	54,259
White fir	4,932	963	3,020	8,915
Engelmann spruce	12,327	–	4,411	16,738
Blue spruce	1,243	–	–	1,243
Softwood total	126,773	7,790	28,498	163,061
Aspen	6,957	–	2,890	9,848
Cottonwood	–	–	1,422	1,422
Hardwood total	6,957	–	4,313	11,270
All species	133,730	7,790	32,811	174,331

Table 34–Annual mortality of sawtimber (Scribner rule) on timberland by species and owner group in northern Utah, 1992.

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand board feet			
Douglas-fir	15,656	5,461	1,001	22,119
Ponderosa pine	1,413	–	–	1,413
Lodgepole pine	41,164	–	4,665	45,829
Bristlecone pine	–	–	–	–
Limber pine	809	–	–	809
Subalpine fir	33,378	369	12,649	46,396
White fir	4,171	829	2,574	7,573
Engelmann spruce	10,546	–	3,847	14,394
Blue spruce	1,125	–	–	1,125
Softwood total	108,263	6,659	24,736	139,658
Aspen	5,923	–	2,451	8,373
Cottonwood	–	–	1,264	1,264
Hardwood total	5,923	–	3,715	9,638
All species	114,186	6,659	28,451	149,296

Table 35–Annual mortality of growing stock on timberland by species and diameter class in northern Utah, 1992.

Species	Diameter class (inches at breast height)													All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet													
Douglas-fir	97	121	379	801	664	541	715	395	492	537	236	–	204	5,184
Ponderosa pine	–	63	–	90	78	–	–	–	–	–	–	–	152	384
Lodgepole pine	797	3,270	3,815	1,414	2,243	1,810	1,827	363	–	334	–	–	–	15,873
Bristlecone pine	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Limber pine	–	–	–	105	–	–	–	–	–	–	–	–	106	211
Subalpine fir	496	962	2,734	1,787	2,887	1,084	1,019	545	132	886	132	–	285	12,949
White fir	196	67	348	355	330	302	334	179	–	157	–	–	–	2,268
Engelmann spruce	–	74	423	137	385	488	254	496	596	123	134	126	153	3,388
Blue spruce	–	–	–	–	–	–	–	–	–	–	227	–	–	227
Softwood total	1,587	4,559	7,699	4,690	6,587	4,225	4,149	1,978	1,220	2,037	729	126	900	40,484
Aspen	1,762	2,370	894	781	563	314	296	98	–	–	–	–	–	7,077
Cottonwood	–	–	–	–	–	–	–	206	–	–	–	–	101	307
Hardwood total	1,762	2,370	894	781	563	314	296	304	–	–	–	–	101	7,384
All species	3,349	6,928	8,593	5,470	7,150	4,539	4,445	2,282	1,220	2,037	729	126	1,001	47,868

Table 36–Annual mortality of sawtimber (International ¼-inch rule) on timberland by species and diameter class in northern Utah, 1992.

Species	Diameter class (inches at breast height)											All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Douglas-fir	1,610	3,975	3,249	2,865	3,818	2,120	2,739	2,986	1,336	–	1,203	25,900
Ponderosa pine	–	406	384	–	–	–	–	–	–	–	831	1,621
Lodgepole pine	13,800	6,106	10,965	9,362	9,576	1,876	–	1,807	–	–	–	53,491
Bristlecone pine	–	–	–	–	–	–	–	–	–	–	–	–
Limber pine	–	305	–	–	–	–	–	–	–	–	588	893
Subalpine fir	11,130	8,223	13,861	5,237	5,143	2,746	696	4,779	743	–	1,700	54,259
White fir	1,389	1,531	1,583	1,393	1,555	805	–	659	–	–	–	8,915
Engelmann spruce	1,825	680	1,894	2,425	1,281	2,566	3,057	643	740	706	921	16,738
Blue spruce	–	–	–	–	–	–	–	–	1,243	–	–	1,243
Softwood total	29,753	21,226	31,937	21,283	21,373	10,113	6,492	10,873	4,063	706	5,242	163,061
Aspen	XXXXX[a]	3,546	2,787	1,555	1,460	499	–	–	–	–	–	9,848
Cottonwood	XXXXX	–	–	–	–	960	–	–	–	–	462	1,422
Hardwood total	XXXXX	3,546	2,787	1,555	1,460	1,459	–	–	–	–	462	11,270
All species	29,753	24,772	34,724	22,838	22,833	11,572	6,492	10,873	4,063	706	5,704	174,331

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 37–Annual mortality of sawtimber (Scribner rule) on timberland by species and diameter class in northern Utah, 1992.

Species	Diameter class (inches at breast height)											All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand board feet											
Douglas-fir	1,424	3,315	2,715	2,344	3,215	1,758	2,403	2,622	1,200	–	1,123	22,119
Ponderosa pine	–	342	331	–	–	–	–	–	–	–	740	1,413
Lodgepole pine	11,997	5,193	9,222	7,840	8,332	1,620	–	1,626	–	–	–	45,829
Bristlecone pine	–	–	–	–	–	–	–	–	–	–	–	–
Limber pine	–	274	–	–	–	–	–	–	–	–	536	809
Subalpine fir	9,816	6,969	11,478	4,288	4,340	2,307	619	4,299	682	–	1,597	46,396
White fir	1,256	1,333	1,309	1,148	1,259	695	–	573	–	–	–	7,573
Engelmann spruce	1,592	561	1,560	1,972	1,066	2,239	2,635	566	676	648	879	14,394
Blue spruce	–	–	–	–	–	–	–	–	1,125	–	–	1,125
Softwood total	26,085	17,987	26,615	17,592	18,212	8,618	5,657	9,686	3,684	648	4,874	139,658
Aspen	XXXXX[a]	3,056	2,348	1,308	1,236	425	–	–	–	–	–	8,373
Cottonwood	XXXXX	–	–	–	–	836	–	–	–	–	428	1,264
Hardwood total	XXXXX	3,056	2,348	1,308	1,236	1,262	–	–	–	–	428	9,638
All species	26,085	21,043	28,963	18,900	19,448	9,880	5,657	9,686	3,684	648	5,302	149,296

[a]Hardwoods are not considered sawtimber until they are 11 inches d.b.h.

Table 38–Annual mortality of growing stock on timberland by species and cause of death in northern Utah, 1992.

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown[a]	Logging	
	Thousand cubic feet								
Douglas-fir	3,654	698	149	–	126	–	557	–	5,184
Ponderosa pine	90	–	293	–	–	–	–	–	384
Lodgepole pine	12,504	1,086	177	109	454	–	1,543	–	15,873
Bristlecone pine	–	–	–	–	–	–	–	–	–
Limber pine	211	–	–	–	–	–	–	–	211
Subalpine fir	4,762	2,758	–	–	2,411	73	2,944	–	12,949
White fir	1,542	139	–	–	–	–	586	–	2,268
Engelmann spruce	1,778	371	109	–	466	–	664	–	3,388
Blue spruce	114	–	–	–	–	–	113	–	227
Softwood total	24,657	5,052	729	109	3,457	73	6,407	–	40,484
Aspen	379	4,349	150	55	414	–	1,649	82	7,077
Cottonwood	–	–	–	–	206	–	101	–	307
Hardwood total	379	4,349	150	55	620	–	1,750	82	7,384
All species	25,036	9,401	878	163	4,077	73	8,157	82	47,868

[a]Because many destructive agents often attack trees in concert or in succession, it is often difficult to identify the actual causal agent. When the primary cause of death cannot be precisely determined, it is listed as unknown.

Table 39–Annual mortality of sawtimber (International ¼-inch rule) on timberland by species and cause of death in northern Utah, 1992.

Species	Cause of death								
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown	Logging	Total
	Thousand board feet								
Douglas-fir	18,804	3,802	–	–	284	–	3,010	–	25,900
Ponderosa pine	406	–	1,215	–	–	–	–	–	1,621
Lodgepole pine	39,133	4,086	885	374	1,860	–	7,153	–	53,491
Bristlecone pine	–	–	–	–	–	–	–	–	–
Limber pine	893	–	–	–	–	–	–	–	893
Subalpine fir	19,776	11,754	–	–	9,949	–	12,781	–	54,259
White fir	5,924	568	–	–	–	–	2,423	–	8,915
Engelmann spruce	8,843	1,902	546	–	2,392	–	3,054	–	16,738
Blue spruce	625	–	–	–	–	–	619	–	1,243
Softwood total	94,404	22,112	2,646	374	14,485	–	29,040	–	163,061
Aspen	617	6,267	–	–	1,516	–	1,035	413	9,848
Cottonwood	–	–	–	–	960	–	462	–	1,422
Hardwood total	617	6,267	–	–	2,476	–	1,497	413	11,270
All species	95,021	28,379	2,646	374	16,961	–	30,537	413	174,331

Table 40–Annual mortality of sawtimber (Scribner rule) on timberland by species and cause of death in northern Utah, 1992.

Species	Cause of death								
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown	Logging	Total
	Thousand board feet								
Douglas-fir	16,028	3,249	–	–	233	–	2,608	–	22,119
Ponderosa pine	342	–	1,072	–	–	–	–	–	1,413
Lodgepole pine	33,489	3,477	744	328	1,577	–	6,215	–	45,829
Bristlecone pine	–	–	–	–	–	–	–	–	–
Limber pine	809	–	–	–	–	–	–	–	809
Subalpine fir	16,763	10,113	–	–	8,567	–	10,953	–	46,396
White fir	4,931	505	–	–	–	–	2,138	–	7,573
Engelmann spruce	7,622	1,632	441	–	2,066	–	2,634	–	14,394
Blue spruce	564	–	–	–	–	–	561	–	1,125
Softwood total	80,547	18,975	2,256	328	12,443	–	25,109	–	139,658
Aspen	534	5,331	–	–	1,269	–	889	350	8,373
Cottonwood	–	–	–	–	836	–	428	–	1,264
Hardwood total	534	5,331	–	–	2,105	–	1,317	350	9,638
All species	81,082	24,306	2,256	328	14,548	–	26,425	350	149,296

Table 41–Area of woodland by forest type and owner group in northern Utah, 1993.

Forest type	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Acres			
Pinyon-juniper	128,892	594,837	422,321	1,146,050
Juniper	58,274	416,474	190,406	665,153
Oak	137,397	27,663	248,316	413,376
Mountain mahogany	26,889	45,925	26,261	99,076
Maple woodland	39,377	7,335	82,877	129,589
All types	390,830	1,092,234	970,180	2,453,244

Table 42–Area of woodland by forest type and stand-size class in northern Utah, 1993.

Forest type	Stand-size class				All classes
	Large diameter	Small diameter	Sapling/ seedling	Nonstocked	
	Acres				
Pinyon-juniper	688,718	407,080	25,292	24,959	1,146,050
Juniper	267,387	384,916	2,597	10,253	665,153
Oak	–	255,475	157,901	–	413,376
Mountain mahogany	24,033	70,221	4,821	–	99,076
Maple woodland	3,550	87,037	39,002	–	129,589
All types	983,689	1,204,730	229,614	35,212	2,453,244

Table 43–Number of live trees on woodland by species and diameter class in northern Utah, 1993.

Species	Diameter class (inches at point of diameter measure)															All classes
	1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand trees															
Douglas-fir	385	227	139	98	93	193	124	38	–	26	111	–	–	–	–	1,433
Limber pine	–	–	38	–	–	–	–	–	–	–	–	–	–	–	–	38
Aspen	218	484	197	–	–	–	–	–	–	–	–	–	–	–	–	899
Cottonwood	–	–	–	35	–	35	–	–	–	–	–	–	–	–	–	69
Pinyon	32,999	19,374	17,045	13,730	9,878	7,194	5,421	3,687	2,410	1,275	911	805	366	274	191	115,559
Juniper	57,121	32,663	33,703	27,989	21,944	18,061	15,641	12,818	8,866	5,792	3,988	2,620	2,070	1,171	2,949	247,395
Oak	540,360	104,626	25,034	3,878	1,087	75	–	–	–	–	–	–	–	–	–	675,060
Mountain mahogany	12,074	5,983	5,899	4,058	2,592	1,687	767	105	392	216	56	–	–	–	–	33,828
Maple	145,083	37,653	15,424	4,130	2,127	1,183	749	178	350	–	–	–	–	–	–	206,877
All species	788,239	201,009	97,478	53,916	37,721	28,429	22,702	16,825	12,018	7,308	5,066	3,424	2,435	1,445	3,141	1,281,158

Table 44–Net volume on woodland by forest type and owner group in northern Utah, 1993.

Forest type	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Pinyon-juniper	121,808	481,209	346,101	949,118
Juniper	43,807	201,766	102,500	348,073
Oak	35,808	2,839	41,349	79,996
Mountain mahogany	12,177	19,319	13,192	44,689
Maple woodland	34,712	7,709	75,729	118,150
All types	248,312	712,842	578,872	1,540,026

Table 45–Net volume on woodland by species and owner group in northern Utah, 1993.

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Douglas-fir	1,177	7,695	1,481	10,353
Limber pine	28	–	–	28
Aspen	28	–	110	138
Cottonwood	–	–	357	357
Pinyon	60,327	249,753	156,719	466,800
Juniper	108,938	429,995	289,149	828,082
Oak	36,133	5,933	38,746	80,812
Mountain mahogany	8,918	12,326	10,717	31,961
Maple	32,762	7,140	81,593	121,495
All species	248,312	712,842	578,872	1,540,026

Table 46–Net volume on woodland by forest type and stand-size class in northern Utah, 1993.

Forest type	Stand-size class				All classes
	Large diameter	Small diameter	Sapling/ seedling	Nonstocked	
	Thousand cubic feet				
Pinyon-juniper	715,684	231,181	2,064	188	949,118
Juniper	214,893	132,315	–	866	348,073
Oak	–	72,298	7,698	–	79,996
Mountain mahogany	17,546	27,029	114	–	44,689
Maple woodland	4,766	101,401	11,983	–	118,150
All types	952,888	564,225	21,859	1,055	1,540,026

Table 47–Net volume on woodland by species and diameter class in northern Utah, 1993.

Species	Diameter class (inches at point of diameter measure)														All classes
	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet														
Douglas-fir	–	72	193	372	1,468	1,762	549	–	1,129	4,808	–	–	–	–	10,353
Limber pine	–	28	–	–	–	–	–	–	–	–	–	–	–	–	28
Aspen	–	138	–	–	–	–	–	–	–	–	–	–	–	–	138
Cottonwood	–	–	124	–	233	–	–	–	–	–	–	–	–	–	357
Pinyon	6,697	19,867	35,336	48,898	59,609	64,770	54,583	45,779	28,225	26,298	31,877	17,590	15,386	11,884	466,800
Juniper	8,109	24,194	41,817	53,425	72,516	84,926	93,764	87,170	65,642	59,449	49,621	50,342	31,444	105,663	828,082
Oak	34,729	30,083	10,423	4,665	911	–	–	–	–	–	–	–	–	–	80,812
Mountain mahogany	1,402	3,500	5,071	5,742	5,442	3,929	584	3,327	2,395	568	–	–	–	–	31,961
Maple	22,443	28,363	18,360	14,726	11,199	12,085	3,329	10,990	–	–	–	–	–	–	121,495
All species	73,381	106,246	111,325	127,828	151,377	167,472	152,809	147,267	97,390	91,123	81,498	67,933	46,830	117,546	1,540,026

Table 48–Net annual growth on woodland by forest type and owner group in northern Utah, 1992.

Forest type	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Pinyon-juniper	608	2,462	1,651	4,721
Juniper	183	1,189	677	2,048
Oak	1,085	232	1,593	2,910
Mountain mahogany	109	266	224	599
Maple woodland	514	245	1,173	1,931
All types	2,499	4,394	5,318	12,210

Table 49–Net annual growth on woodland by species and owner group in northern Utah, 1992.

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Douglas-fir	22	12	30	64
Limber pine	3	–	–	3
Aspen	2	–	5	8
Cottonwood	–	–	6	6
Pinyon	278	1,491	928	2,697
Juniper	503	2,117	1,369	3,988
Oak	1,065	442	1,585	3,092
Mountain mahogany	90	155	79	323
Maple	536	178	1,316	2,030
All species	2,499	4,394	5,318	12,210

Table 50–Net annual growth on woodland by forest type and stand-size class in northern Utah, 1992.

Forest type	Stand-size class				All classes
	Large diameter	Small diameter	Sapling/ seedling	Nonstocked	
	Thousand cubic feet				
Pinyon-juniper	2,973	1,686	47	15	4,721
Juniper	837	1,201	–	10	2,048
Oak	–	2,325	585	–	2,910
Mountain mahogany	126	470	3	–	599
Maple woodland	47	1,490	394	–	1,931
All types	3,984	7,172	1,030	25	12,210

Table 51–Net annual growth on woodland by species and diameter class in northern Utah, 1992.

Species	Diameter class (inches at point of diameter measure)														All classes
	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet														
Douglas-fir	–	12	12	10	–57	23	3	–	14	47	–	–	–	–	64
Limber pine	–	3	–	–	–	–	–	–	–	–	–	–	–	–	3
Aspen	–	8	–	–	–	–	–	–	–	–	–	–	–	–	8
Cottonwood	–	–	3	–	3	–	–	–	–	–	–	–	–	–	6
Pinyon	345	368	416	354	352	273	69	171	95	83	76	41	30	24	2,697
Juniper	354	378	480	463	521	457	333	223	210	159	105	96	58	152	3,988
Oak	2,401	507	129	48	7	–	–	–	–	–	–	–	–	–	3,092
Mountain mahogany	56	52	62	53	43	25	4	16	10	2	–	–	–	–	323
Maple	1,272	399	127	18	88	65	17	44	–	–	–	–	–	–	2,030
All species	4,429	1,726	1,230	945	956	844	426	453	328	291	181	138	88	176	12,210

Mortality

Table 52–Annual mortality on woodland by forest type and owner group in northern Utah, 1992.

Forest type	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Pinyon-juniper	79	564	219	861
Juniper	–	–	–	–
Oak	154	–	–	154
Mountain mahogany	15	–	–	15
Maple woodland	72	–	217	289
All types	319	564	436	1,319

Table 53–Annual mortality on woodland by species and owner group in northern Utah, 1992.

Species	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Douglas-fir	–	99	–	99
Limber pine	–	–	–	–
Aspen	–	–	–	–
Cottonwood	–	–	–	–
Pinyon	67	388	132	587
Juniper	–	78	87	164
Oak	171	–	–	171
Mountain mahogany	15	–	–	15
Maple	67	–	217	284
All species	319	564	436	1,319

Table 54–Annual mortality on woodland by forest type and stand-size class in northern Utah, 1992.

Forest type	Stand-size class				All classes
	Large diameter	Small diameter	Sapling/ seedling	Nonstocked	
	Thousand cubic feet				
Pinyon-juniper	570	291	–	–	861
Juniper	–	–	–	–	–
Oak	–	132	22	–	154
Mountain mahogany	–	15	–	–	15
Maple woodland	–	247	43	–	289
All types	570	685	64	–	1,319

Table 55–Annual mortality on woodland by species and diameter class in northern Utah, 1992.

Species	Diameter class (inches at point of diameter measure)														All classes
	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
	Thousand cubic feet														
Douglas-fir	–	–	–	–	99	–	–	–	–	–	–	–	–	–	99
Limber pine	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aspen	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cottonwood	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Pinyon	2	17	73	163	89	84	158	–	–	–	–	–	–	–	587
Juniper	–	–	–	–	–	–	78	87	–	–	–	–	–	–	164
Oak	162	9	–	–	–	–	–	–	–	–	–	–	–	–	171
Mountain mahogany	8	7	–	–	–	–	–	–	–	–	–	–	–	–	15
Maple	71	37	68	108	–	–	–	–	–	–	–	–	–	–	284
All species	243	70	141	271	188	84	235	87	–	–	–	–	–	–	1,319

Table 56–Area of timberland by county and owner group in northern Utah, 1993.

County	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Acres			
Box Elder	9,242	4,270	13,386	26,898
Cache	131,754	15,063	58,633	205,449
Daggett	150,220	9,873	2,070	162,163
Davis	10,604	526	387	11,517
Duchesne	243,921	19,752	92,352	356,025
Morgan	3,934	4,932	61,460	70,326
Rich	34,959	11,039	31,550	77,548
Salt Lake	28,371	107	17,503	45,981
Summit	301,490	6,985	152,626	461,101
Tooele	7,852	17,559	19,902	45,313
Uintah	201,637	66,031	26,685	294,354
Utah	152,986	10,328	32,672	195,986
Wasatch	276,916	22,980	80,695	380,591
Weber	26,427	3,761	26,692	56,879
Total	1,580,313	193,205	616,614	2,390,132

Table 57–Net volume of growing stock on timberland by county and owner group in northern Utah, 1993.

County	Owner group: National Forest	Other public	Nonindustrial private	Total
	Growing stock			
	Thousand cubic feet			
Box Elder	15,185	7,289	11,587	34,060
Cache	269,288	14,053	66,391	349,731
Daggett	158,128	4,254	2,804	165,186
Davis	13,865	1,001	595	15,460
Duchesne	388,642	11,471	98,533	498,646
Morgan	5,799	4,715	82,957	93,470
Rich	90,129	5,182	31,234	126,545
Salt Lake	48,294	189	25,302	73,785
Summit	556,215	5,509	216,922	778,646
Tooele	11,678	25,766	19,274	56,717
Uintah	276,840	24,940	29,933	331,714
Utah	221,420	16,859	40,450	278,729
Wasatch	425,473	17,953	87,178	530,604
Weber	42,030	3,005	43,147	88,182
Total	2,522,985	142,186	756,306	3,421,476
	Sawtimber			
	Thousand board feet, International ¼-inch rule			
Box Elder	67,497	34,026	33,766	135,289
Cache	1,130,786	40,865	273,128	1,444,779
Daggett	428,952	17,412	8,735	455,100
Davis	58,457	4,804	1,931	65,192
Duchesne	1,393,539	50,910	301,168	1,745,617
Morgan	25,525	13,735	251,217	290,477
Rich	351,944	15,447	110,043	477,434
Salt Lake	189,370	889	90,214	280,474
Summit	1,803,133	17,581	723,599	2,544,312
Tooele	50,591	114,905	72,960	238,456
Uintah	850,237	102,743	113,567	1,066,547
Utah	878,466	77,715	138,774	1,094,954
Wasatch	1,327,568	57,294	244,463	1,629,326
Weber	169,754	8,738	149,492	327,983
Total	8,725,820	557,064	2,513,056	11,795,940
	Sawtimber			
	Thousand board feet, Scribner rule			
Box Elder	57,945	28,554	28,444	114,944
Cache	967,414	33,973	236,294	1,237,680
Daggett	367,497	14,784	7,410	389,691
Davis	49,938	3,947	1,658	55,543
Duchesne	1,189,173	43,105	256,749	1,489,028
Morgan	21,779	11,421	215,652	248,852
Rich	299,618	12,875	94,963	407,456
Salt Lake	162,030	741	77,502	240,273
Summit	1,540,608	15,647	617,014	2,173,269
Tooele	43,272	99,874	61,066	204,212
Uintah	722,794	86,890	98,020	907,704
Utah	748,544	65,850	119,193	933,586
Wasatch	1,140,216	50,978	205,969	1,397,163
Weber	145,228	7,264	128,406	280,897
Total	7,456,055	475,903	2,148,339	10,080,297

Table 58–Net annual growth of growing stock on timberland by county and owner group in northern Utah, 1992.

County	Owner group: National Forest	Other public	Nonindustrial private	Total
	Growing stock			
	Thousand cubic feet			
Box Elder	221	117	165	503
Cache	915	388	340	1,643
Daggett	2,975	−17	54	3,013
Davis	41	14	19	74
Duchesne	4,085	24	1,738	5,847
Morgan	4	129	2,743	2,876
Rich	1,135	132	115	1,382
Salt Lake	179	3	686	868
Summit	7,164	23	1,392	8,579
Tooele	56	503	72	631
Uintah	−104	−205	210	−99
Utah	1,942	287	1,166	3,395
Wasatch	6,357	76	1,935	8,369
Weber	191	83	1,225	1,499
Total	25,163	1,557	11,860	38,580
	Sawtimber			
	Thousand board feet, International ¼-inch rule			
Box Elder	1,278	555	170	2,003
Cache	15,192	847	7,870	23,909
Daggett	5,921	−234	268	5,955
Davis	331	75	43	449
Duchesne	19,154	224	6,203	25,581
Morgan	131	265	5,708	6,104
Rich	4,496	2	3,099	7,597
Salt Lake	1,471	14	1,941	3,426
Summit	32,976	421	−3,111	30,286
Tooele	467	2,022	−66	2,423
Uintah	−7,708	−2,326	714	−9,319
Utah	8,542	1,294	3,033	12,869
Wasatch	18,549	1,347	1,508	21,403
Weber	2,357	181	3,254	5,792
Total	103,156	4,687	30,634	138,478
	Sawtimber			
	Thousand board feet, Scribner rule			
Box Elder	1,070	445	125	1,640
Cache	13,117	688	7,006	20,812
Daggett	5,030	−202	220	5,048
Davis	329	58	36	423
Duchesne	16,301	175	5,040	21,517
Morgan	144	214	4,707	5,065
Rich	3,720	−11	2,754	6,463
Salt Lake	1,413	11	1,604	3,029
Summit	28,036	376	−3,282	25,130
Tooele	433	1,696	−105	2,023
Uintah	−6,725	−2,026	544	−8,206
Utah	6,685	1,052	2,506	10,243
Wasatch	15,621	1,204	1,055	17,879
Weber	2,030	147	2,689	4,865
Total	87,202	3,829	24,898	115,929

Table 59–Annual mortality of growing stock on timberland by county and owner group in northern Utah, 1992.

County	Owner group: National Forest	Other public	Nonindustrial private	Total
	Growing stock			
	Thousand cubic feet			
Box Elder	59	46	133	239
Cache	3,938	–	989	4,927
Daggett	1,914	135	11	2,061
Davis	311	9	4	323
Duchesne	4,321	156	775	5,252
Morgan	140	8	510	657
Rich	610	132	647	1,389
Salt Lake	973	1	200	1,175
Summit	5,905	95	3,711	9,710
Tooele	201	69	365	634
Uintah	8,723	987	362	10,072
Utah	4,240	90	300	4,630
Wasatch	4,540	317	1,015	5,872
Weber	600	–	325	926
Total	36,474	2,046	9,348	47,868
	Sawtimber			
	Thousand board feet, International ¼-inch rule			
Box Elder	282	207	552	1,041
Cache	17,492	–	1,824	19,316
Daggett	4,884	664	32	5,581
Davis	1,276	39	13	1,327
Duchesne	15,706	605	2,490	18,800
Morgan	616	24	1,571	2,211
Rich	2,170	383	656	3,208
Salt Lake	3,614	6	654	4,274
Summit	21,675	–	16,102	37,777
Tooele	817	309	1,511	2,638
Uintah	29,317	5,121	1,588	36,026
Utah	15,532	402	967	16,901
Wasatch	17,674	30	3,800	21,505
Weber	2,674	–	1,052	3,726
Total	133,730	7,790	32,811	174,331
	Sawtimber			
	Thousand board feet, Scribner rule			
Box Elder	238	178	464	881
Cache	14,912	–	1,532	16,444
Daggett	4,186	564	27	4,778
Davis	1,054	33	11	1,098
Duchesne	13,418	517	2,129	16,063
Morgan	507	20	1,319	1,846
Rich	1,899	323	551	2,773
Salt Lake	3,000	5	549	3,555
Summit	18,605	–	14,189	32,793
Tooele	675	266	1,272	2,212
Uintah	24,972	4,380	1,404	30,756
Utah	13,243	346	812	14,401
Wasatch	15,192	26	3,309	18,527
Weber	2,285	–	884	3,169
Total	114,186	6,659	28,451	149,296

Table 60–Area of woodland by county and owner group in northern Utah, 1993.

County	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Acres			
Box Elder	15,603	115,996	146,497	278,096
Cache	20,691	8,908	35,258	64,857
Daggett	42,155	60,909	4,023	107,086
Davis	6,628	4,091	3,492	14,211
Duchesne	60,615	102,683	248,362	411,660
Morgan	2,394	3,370	58,359	64,123
Rich	1,191	11,682	3,903	16,776
Salt Lake	7,797	1,113	21,611	30,522
Summit	2,623	2,575	86,550	91,749
Tooele	33,252	269,094	73,675	376,022
Uintah	2,462	429,886	147,486	579,834
Utah	165,744	73,545	54,694	293,982
Wasatch	16,168	6,478	51,388	74,034
Weber	13,506	1,905	34,881	50,292
Total	390,830	1,092,234	970,180	2,453,244

Table 61–Net volume on woodland by county and owner group in northern Utah, 1993.

County	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Box Elder	7,590	58,307	85,219	151,116
Cache	11,992	1,373	31,514	44,879
Daggett	34,471	44,573	2,968	82,012
Davis	2,465	1,292	770	4,527
Duchesne	44,712	84,705	200,584	330,002
Morgan	881	1,057	23,128	25,066
Rich	733	13,285	2,817	16,835
Salt Lake	2,810	481	10,592	13,883
Summit	790	4,679	11,583	17,051
Tooele	27,473	138,408	35,500	201,380
Uintah	1,992	319,608	134,773	456,373
Utah	98,056	32,244	24,373	154,674
Wasatch	5,655	12,536	4,500	22,691
Weber	8,691	293	10,553	19,537
Total	248,312	712,842	578,872	1,540,026

Table 62–Net annual growth on woodland by county and owner group in northern Utah, 1992.

County	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Box Elder	71	561	755	1,388
Cache	144	76	372	592
Daggett	104	218	17	339
Davis	46	33	31	110
Duchesne	223	272	890	1,385
Morgan	16	26	717	759
Rich	10	49	19	78
Salt Lake	51	7	170	227
Summit	41	11	438	490
Tooele	130	1,189	336	1,655
Uintah	12	1,538	644	2,194
Utah	1,408	364	328	2,100
Wasatch	124	31	203	359
Weber	119	16	398	533
Total	2,499	4,394	5,318	12,210

Table 63–Annual mortality on woodland by county and owner group in northern Utah, 1992.

County	Owner group			Total
	National Forest	Other public	Nonindustrial private	
	Thousand cubic feet			
Box Elder	4	–	–	4
Cache	27	–	–	27
Daggett	67	44	–	111
Davis	1	–	–	1
Duchesne	–	216	157	373
Morgan	1	–	4	5
Rich	2	–	–	2
Salt Lake	4	–	85	89
Summit	–	–	15	15
Tooele	1	–	–	1
Uintah	–	304	–	304
Utah	177	–	170	347
Wasatch	7	–	5	12
Weber	27	–	–	27
Total	319	564	436	1,319

Brown, Mark J.; O'Brien, Renee A. 1997. Forest resource statistics for northern Utah, 1993. Resour. Bull. INT-RB-91. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 53 p.

Presents area, stand, volume, growth, and mortality data for timberland and woodland across all ownerships in northern Utah.

Keywords: forest survey, inventory, volume, growth, mortality, timberland, woodland

You may order additional copies of this publication by sending your mailing information in label form through one of the following media. Please specify the publication title and Resource Bulletin number.

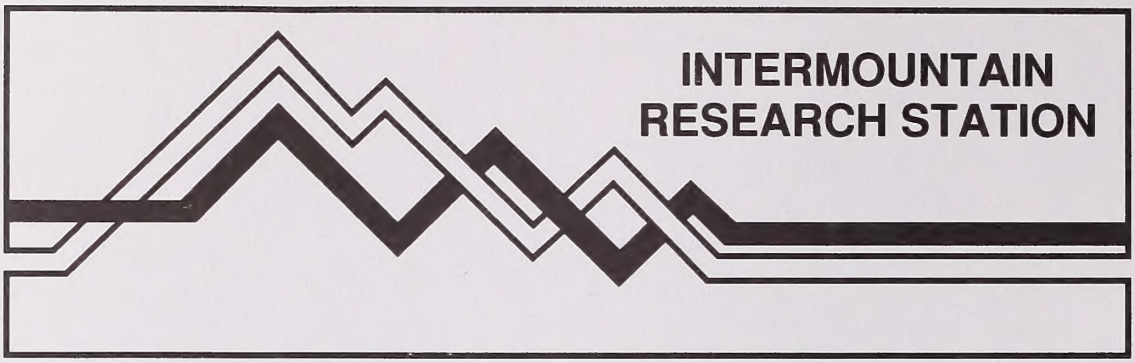
Telephone (801) 625-5437

DG message Pubs:S22A

FAX (801) 625-5129, Attn: Publications

E-mail /s=pubs/ou1=s22a@mhs-fswa.attmail.com

Mailing Address Publications Distribution
Intermountain Research Station
324 25th Street
Ogden, UT 84401



The Intermountain Research Station provides scientific knowledge and technology to improve management, protection, and use of the forests and rangelands of the Intermountain West. Research is designed to meet the needs of National Forest managers, Federal and State agencies, industry, academic institutions, public and private organizations, and individuals. Results of research are made available through publications, symposia, workshops, training sessions, and personal contacts.

The Intermountain Research Station territory includes Montana, Idaho, Utah, Nevada, and western Wyoming. Eighty-five percent of the lands in the Station area, about 231 million acres, are classified as forest or rangeland. They include grasslands, deserts, shrublands, alpine areas, and forests. They provide fiber for forest industries, minerals and fossil fuels for energy and industrial development, water for domestic and industrial consumption, forage for livestock and wildlife, and recreation opportunities for millions of visitors.

Several Station units conduct research in additional western States, or have missions that are national or international in scope.

Station laboratories are located in:

Boise, Idaho

Bozeman, Montana (in cooperation with Montana State University)

Logan, Utah (in cooperation with Utah State University)

Missoula, Montana (in cooperation with the University of Montana)

Moscow, Idaho (in cooperation with the University of Idaho)

Ogden, Utah

Provo, Utah (in cooperation with Brigham Young University)

Reno, Nevada (in cooperation with the University of Nevada)